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15 July 1985

Worldwide Report

**NUCLEAR DEVELOPMENT
AND
PROLIFERATION**



FOREIGN BROADCAST INFORMATION SERVICE

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15 July 1985

WORLDWIDE REPORT
NUCLEAR DEVELOPMENT AND PROLIFERATION

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AUSTRALIA

FIRMS SAY ROXBY DOWNS PROJECT COMMERCIALY VIABLE

HK121224 Hong Kong AFP in English 1013 GMT 12 Jun 85

[By David Davies]

[Text] Melbourne, Australia, 12 Jun (AFP)--Western Mining Corp (WMC) and British Petroleum (BP) Australia have declared the initial stage of the controversial Roxby Downs uranium-copper-gold mining project in South Australia commercially viable.

A statement issued yesterday by the two partners in the project said that a final decision on the start date for constructing the mine's plant and infrastructure would be taken within six months.

The announcement of the construction start date would be the virtual go-ahead for the mine, observers said.

The announcement said that production of gold was expected to begin in mid-1987 with copper and uranium production scheduled to start in mid-1988.

The original project was for production of 150,000 tonnes of copper per year and up to 4,000 tonnes of uranium oxide.

But in the initial stage at present envisaged production has been scaled down to 55,000 tonnes of copper, 2,000 tonnes of uranium oxide and 90,000 ounces of gold per year, according to figures released by the partners.

The announcement said the negotiations with potential customers had commenced.

A WMC spokesman said the market for copper and uranium was "soft" and that for several years the project might proceed in stages rather than as one development.

"We expect the market to improve in the next decade and we would expand to higher production rates at a later date," the spokesman said.

The Roxby Downs mine has been the target of anti-nuclear peace demonstrators who last year attempted to blockade the sprawling mine site in the remote outback 500 kilometres (300 miles) northwest of Adelaide.

But Roxby Downs has received the backing of the state and federal Labor governments despite left-wing opposition to uranium mining.

At present Roxby Downs employs about 400 workers in the development stage but in the construction phase the work force would expand to 2,000, the spokesman said.

CSO: 5100/4311

CANADA

TWO ONTARIO HYDRO REACTORS SHUT DOWN DUE TO LACK OF MARKET

Toronto THE GLOBE AND MAIL in English 27 Apr 85 p 11

[Text]

Two Ontario Hydro nuclear reactors are sitting idle this weekend for lack of a buyer for their one million kilowatts of generating capacity.

Hydro spokesmen said yesterday the utility was shutting down one Pickering generating station reactor for the weekend and delaying the planned start-up of a second reactor until Monday.

James Harris, Hydro's manager of resource utilization, said it was the first time the utility has shut down a reactor because there was no market for its output.

Mr. Harris said Hydro offered the power at attractive rates — about one cent per kilowatt hour instead of the usual charge of about four cents — but neighboring U.S. utilities said they couldn't use it.

Under such circumstances, he said, it is cheaper for Hydro to shut down a nuclear unit rather than to spill water over hydro-electric dams.

CSO: 5120/18

CANADA

ONTARIO HYDRO NUCLEAR STATIONS SHUT DOWN BY STRIKE

Ottawa THE CITIZEN in English 6 May 85 pp A1, A16

[Text]

Talks aimed at ending a strike at Ontario Hydro collapsed Sunday after the two sides failed to agree on sending the key issue in the dispute to binding arbitration.

While the union wanted the issue of contracting-out of work to be submitted to binding arbitration, Hydro wanted it sent to an independent, three-member panel appointed by the Ministry of Labor, said Hydro spokesman Grant Elliot.

Representatives of the Ontario Hydro Employees Union, representing 15,000 employees, said they had made a counter-proposal on the contracting-out issue but would not give details. They also expressed anger with Ontario Hydro for talking to the media about its proposal.

Meanwhile, company officials have said that consumers will not likely face electricity shortages because of the strike, which began early Sunday despite the efforts of a provincial mediator.

When the workers walked out over wages, pensions and job security at midnight Saturday, about 1,500 managers replaced them at 68 water-powered generators and four stations with coal-fired generators throughout Ontario.

Management-run stations will supply between 13,000 and 14,000 megawatts a day, slightly short of the average 14,250 megawatts used daily at this time of year, Hydro says.

Hydro officials say they'll buy power from neighboring provinces and the United States before considering blackouts, brownouts or power rationing.

Company spokesman Michele McMaster said any costs of the strike would likely be recouped through 1987 rate increases.

The utility has asked the Ontario Energy Board to approve a 3.6-per-cent rate hike in 1986.

One-third of the province's electricity comes from the Pickering and Bruce nuclear stations which shut down Saturday after the Atomic Energy Control Board ruled last week that managers lacked the experience to operate the nuclear reactors safely.

With the nuclear units shut down, the publicly-owned utility has begun "hands-on" training it hopes will satisfy the board.

It hopes this will allow Hydro to resume partial operation of the nuclear plants in 10 days to three weeks.

But a union spokesman said it was not likely supervisors could be trained while the reactors are shut down.

"When Hydro is training our people, they have to have an operating unit," said union official Brian Dougherty.

Ottawa Hydro spokesman Carl Kropp doesn't expect problems because of the time of year. Kropp said it's too warm for heavy use of furnaces and too cool for air conditioners.

Another union spokesman, Jim Donaldson, said with members voting 72 per cent in favor of a strike, the union is going to have to get some major concessions out of Hydro before it accepts an offer.

The strike is the first by the union since a four-month walkout in 1972 that ended when the Ontario government persuaded the two sides to accept arbitration.

It affects about 225 Ottawa-Carleton workers.

CSO: 5120/18

CANADA

POWER CUTS, END OF ONTARIO HYDRO STRIKE REPORTED

Power Cuts to Firms

Toronto THE TORONTO STAR in English 15 May 85 p A12

[Article by John Deverell]

[Text]

Ontario Hydro cut power to major industrial users yesterday afternoon on the 10th day of a strike by 15,000 of its employees, members of the Canadian Union of Public Employees.

The utility reduced power supplies to major steel companies, mines and cement plants by 250 megawatts for five hours because of weather conditions. It does not expect to have to do the same today.

Hydro spokesman Bill Friday said the industrial users have special contracts for power at cheap rates but, in return, the utility can disrupt supply without penalty.

Hot sunshine and low winds in the Niagara region combined to reduce the "ampacity" of transmission lines from the Niagara Falls generators into Hamilton, Friday said.

Ottawa THE CITIZEN in English 17 May 85 p A5

[Text]

TORONTO (CP) — A settlement was reached early today in the 12-day-old strike at Ontario Hydro.

Fred Bennett, a Hydro spokesman, said Deputy Labor Minister Tom Armstrong announced that a memorandum of settlement was signed early this morning by the public utility and Local 100, Canadian Union of Public Employees, that will end the strike and send outstanding issues to binding arbitration.

Bennett said: "Both sides have agreed that every effort will be made to get employees back to work as soon as possible."

Employees will be notified of their recall to work within a few days and Hydro stations shut down because of the strike should be back in operation by the weekend, he said.

Earlier Thursday, Ontario Hydro had begun the start-up of one nuclear reactor at its giant Bruce operations on Lake Huron after the Atomic Energy Control Board ruled management staff were capable of running the complicated equipment.

Hydro spokesman Mike Williams said the 750-megawatt reactor should be operational sometime during the weekend.

The reactor provides "about as much power as that used by one-third of Metropolitan Toronto," Williams said.

Eleven reactors at Bruce and Pickering on Lake Ontario had been shut down since May 5 by a strike of 15,000 Hydro workers. The atomic control board turned down two

previous applications to allow the operation of three management-run reactors, saying personnel was not sufficiently trained.

But, following the board's guidelines, Hydro completed the training of one team at Bruce. In a special, 30-minute telephone conference call Thursday, the four members of the federal nuclear regulatory agency unanimously approved a staff recommendation to allow the Bruce operation.

Supervisory personnel had been operating the utility's coal-fired plants sprinkled throughout the province since the strike began.

Union spokesman Jim Bolan said Thursday the board had "failed to protect the people of Canada from (the risk of) a radioactive accident" by allowing managers without critical "hands-on" training to run the reactor.

Later Thursday, the union issued a news release saying it had received an anonymous tip that a heavy water spill had occurred at the Bruce site.

Hydro spokesman Bill Friday said it wasn't a spill but rather a case of "somebody pushing the wrong button while doing a safety test, causing light water to dilute the heavy water system."

The strike had been largely unfelt by the public as Hydro has bought imported power from Manitoba, Quebec and the United States. Hydro admits the cost of these purchases will have to be recovered in unspecified future rate increases.

CANADA

REVIEW OF MARITIME NUCLEAR ARMS POLICY URGED

Toronto THE GLOBE AND MAIL in English 11 May 85 p 4

[Article by Deborah Jones]

[Text]

HALIFAX — Canadian policies concerning nuclear arms at sea are "in desperate need of clarification," a seminar of defence experts was told yesterday.

While resistance to nuclear weapons on land and in the air is increasing, maritime forces will rely more and more on nuclear systems and capabilities, said Rod Byers, director of the research program in strategic studies at York University.

Canada's stated policy is to promote conventional deterrents and reduce reliance on nuclear arms, he told the seminar, sponsored by the Canadian Institute of Strategic Studies. But Canadian ships are working with other nations' navies that do have nuclear capability, and most analysts agree that a sea conflict would not remain conventional, he said.

Professor Byers questioned how long Canada "can operate in an environment where technology and new nuclear systems are increasing the prospects for a nuclear war. Should these trends continue into the 1990s, will Canada's maritime forces find it increasingly difficult to effectively perform their primary missions within the NATO context unless nuclear weapons are acquired?"

Prof. Byers said he is opposed to introducing nuclear arms to the Canadian navy, but said the Government should deal with the issue before it is forced to.

"Should we be concerned that the U.S. Government and/or the U.S. Navy will pressure Canada to acquire nuclear weapons at sea?"

Prof. Byers said that politically, it is logical for Canada to remain nuclear-free, despite military logic that indicates it should be nuclear-capable.

He said that if Canadian analysts and naval planners determine that missions could be performed with conventional systems using new technology, Canada's arms limitation policy should include the reduction of maritime nuclear systems.

Nuclear capability should be one of the main issues addressed in a review of Canada's defence policy, Prof. Byers said. Canada does not have a Cabinet-approved defence policy and the Government needs to deal with issues of strategic doctrine and a serious credibility gap that developed while the Liberals were in power, he added.

Prof. Byers noted that the Progressive Conservatives had committed the Government to a defence review, but Erik Nielsen's placement as Defence Minister after the resignation of Robert Coates has created uncertainty about it.

Financing of defence remains controversial, he noted. Mr. Coates had indicated early this year that defence spending would increase by 6 per cent and 1985/86

estimates could be expected to be \$9.7-billion, rather than \$9.53-billion, which the Liberals had set.

"In fact, the 1985/86 Conservative defence estimates were tabled at \$9.37-billion. This constitutes a reduction of \$160-million from Liberal estimates. In addition, Finance Minister (Michael) Wilson cut \$154-million in his November financial statement on the grounds that inflation rates have lowered."

Prof. Byers said "the financial situation poses real dilemmas for the Conservative Government, and may be one of the reasons why (Mr. Nielsen) is less anxious to hold a public review."

Another issue raised at the seminar was Canada's lack of minesweepers.

CSO: 5120/19

CANADA

CONSTRUCTION OF SECOND NUCLEAR UNIT AT POINT LEPREAU URGED

Toronto THE GLOBE AND MAIL in English 11 May 85 p B6

[Article by Robert Gibbens]

[Text]

MONTREAL — Canada should proceed with a second nuclear generating unit at Point Lepreau, N.B., to provide local construction jobs and support the domestic nuclear industry, says the Canadian Nuclear Association.

The construction of CANDU stations in Canada to supply power needs in the United States is now a competitive option for many U.S. utilities, the association says in a brief to the federal Government. It argues that Canada should seize the opportunity that exists in the second Lepreau unit.

Many nuclear equipment manufacturers badly need new orders to maintain their technological capabilities so they are ready for the time when the export market starts to recover. Addition of the second Lepreau unit would provide an important bridge, the CNA brief says.

It urges the federal Government to press vigorously for establishment of a common set of rules for international trade in nuclear materials and technology. While most of the industry's foreign trade is in uranium exports, other areas — the export of nuclear power, the

sale of CANDU reactors and technology, isotopes, and medical and industrial nuclear technology — all offer promise in the next decade.

The uranium export market, which generated about \$1-billion last year despite depressed prices, is looking more promising because Western reactor capacity, after a long hiatus in new plant construction, is expected to grow by more than 50 per cent within the next six years.

The brief asks the Government to push ahead with nuclear co-operation agreements with developing countries to encourage sales of nuclear equipment. These countries will account for 75 per cent of world power generation within 30 years, it says.

During the past 15 years, while only one oil sands processing plant has been built, the nuclear industry has completed 14 reactors for an investment of about \$14.5-billion, the association says. In addition, seven uranium mines and two processing plants costing about \$3.1-billion were completed. The industry's economic impact is spread across most of the country, the brief says.

CANADA

MANITOBA NUCLEAR DUMP FEASIBILITY STUDY PROTESTED

Toronto THE GLOBE AND MAIL in English 18 May 85 p 8

[Article by Michael Tenszen]

[Text]

WINNIPEG

BY THE end of the century, eastern Manitoba will be the site of North America's first commercial, underground nuclear waste dump, anti-nuclear activists say.

Atomic Energy of Canada Ltd. — which operates a nuclear research plant near Pinawa, Man., about 80 kilometres north-east of here — is digging an experimental shaft at nearby Lac du Bonnet that may go 440 metres into the granite of the Canadian Shield. The AECL says it only wants to study the feasibility of storing nuclear waste underground. The company has reassured Manitobans that the ultimate site for such an underground nuclear dump will be somewhere in Ontario, near that province's nuclear plants.

"My experience has been that the nuclear establishment has always told people that they have no intention of doing this, or doing that, but things soon just happen," says Walter Robbins, a leading figure in Manitoba's anti-nuclear movement. Mr. Robbins has lobbied for, but been denied, a full public hearing on all of AECL's activities in Eastern Manitoba.

In addition to concerns that transportation of the radioactive wastes to Manitoba could be hazardous to residents and wildlife, anti-nuclear activists worry radioactivity could leak into the water or the air through faults in the granite once materials were in the shaft.

Mr. Robbins says the attitude of the AECL scientists is dangerous. "These people believe in their own infallibility.

They really believe that they can transport and store radioactive waste without anything happening. We have had enough Love Canals."

The activists say that given the money invested in the AECL shaft, and that once the scientists prove their hole in the ground — called the Underground Research Laboratory — can safely store nuclear waste, it is a simple and logical step to begin using it to store waste from Canada and the United States. The shaft could become the first commercial storage site in North America and Canada could make a fortune storing U.S. waste as well as its own, they say.

AECL spokesman Egon Frech says there is no grand conspiracy to store nuclear waste at Lac du Bonnet, but "there is absolutely no guarantee that we could give (precluding a dump) that could not be revoked in the future."

Mr. Frech said it is "not in the cards" for the United States to ever send its wastes into Manitoba. He said the AECL's Canadian waste site will probably be somewhere in Ontario. "We are not planning a waste disposal site here (in Manitoba)."

The AECL has sunk several experimental shafts in Ontario, in the same type of rock as the one in Manitoba. But the Crown corporation has met stiff opposition in many of the communities where it has attempted underground experiments. Manitoba anti-nuclear organizers say the AECL sees Manitoba as "a soft touch."

Canada and the United States must both find waste sites soon. Ontario Hydro needs a dumping place by 2020, and the U.S.

Government must find one by 1995.

The Manitoba activists say that because U.S. communities oppose underground storage plans there, the Lac du Bonnet shaft will eventually house U.S. wastes, at least temporarily.

At the urging of the activists, Manitoba politicians have promised that the AECL will never be allowed to store nuclear waste at Lac du Bonnet. But that is not enough for the anti-nuclear forces, who say governments change and politicians can be persuaded to reconsider issues.

Federal officials and politicians have written to Manitoba's Committee of Concerned Citizens defending AECL's activities in Eastern Manitoba, and stating that they believe the company has no intention to open a dump.

"But all of the letters contain the same clear message," says a committee spokesman. "Manitoba will not be exempted from (consideration for) any future high-level commercial underground radioactive waste storage facility. These statements invalidate AECL public relations efforts here to convince Manitobans that the repositories must go to Ontario."

Last year, Mr. Robbins, 59, an ex-U.S. government bureaucrat, with grants from the Canada Council and the Manitoba Arts Council, published a book called *Getting The Shaft: The Radioactive Waste Controversy In Manitoba*. The book describes how Mr. Robbins and his wife, Phyl, tried the country life at Lac du Bonnet, only to find that an experimental nuclear waste storage shaft was planned nearby.

Mr. Robbins, who once worked with middle-level scientists and bureaucrats in

the U.S. atomic energy administration, says all he has seen and been able to glean through documents and discussions leads him to believe Manitoba will be the site of Canada's first nuclear dump.

He does not proffer an AECL conspiracy theory exactly, but says Canada and the United States will eventually have to use the site because they will have so much money invested in it.

On April 2, the Council of the Regional Municipality of Lac du Bonnet rescinded its earlier resolution banning permanent underground storage of radioactive waste in Manitoba. It is the only council in Manitoba to do so. Every other municipality in the province that has considered the question has banned atomic waste dumps.

The activists feel that either AECL efforts have finally worn down the Lac du Bonnet council, or the business community there simply welcomes the increased economic activity that a storage area would bring. There are already 1,150 people employed at the AECL's Whiteshell Nuclear Research Station.

Another ominous sign, say the anti-nuclear activists, is the U.S. Federal Energy Department's recent suggestion to AECL that the United States contribute up to \$30-million to the Lac du Bonnet experiment. Total capital costs will be \$60-million by the time it is finished in 15 years, according to Mr. Frech. About \$16-million would go toward doubling the projected depth of the shaft to 440 meters from AECL's original projection of 240 metres. U.S. scientists would also work on the waste storage experiments.

CANADA

AECL CONSIDERING SALE OF KANATA RADIO-CHEMICAL PLANT

Ottawa THE CITIZEN in English 31 May 85 p B7

[Text]

Atomic Energy of Canada Ltd. is considering selling off its profitable radio-chemical plant in Kanata.

James Donnelly, president of the Crown corporation, told the Commons natural resources committee Thursday the plant, which employs 800, may be sold, but the company won't make a decision for at least a year.

Asked afterwards about potential buyers for the plant, which made a profit of between \$7 million and \$8 million last year, Donnelly refused to comment.

"We're looking at the opportunity of privatizing it, but I wouldn't speculate as to whom or how it would be done," he said in an interview.

The radio-chemical division makes cancer therapy equipment and equipment used to sterilize medical instruments and industrial waste. It also produces a range of radio-active isotopes for medical and industrial use.

Selling the division would re-

duce the size of AECL, in keeping with the federal government's aim to pare down its number of Crown corporations. AECL's major sales come from Candu reactors. Nuclear supply and services last year accounted for \$196 million revenues.

Donnelly told the committee the company is looking at electrical utilities and the private sector to increase its revenue.

Last week's federal budget cut the government's annual contribution to reactor research. Over five years, government funding will drop from \$200 million a year to \$100 million.

Also, AECL is looking at its new consulting service to generate funds. This year the company expects to earn \$53 million in consulting fees, Donnelly said.

He said he doesn't share the government's view that the Candu reactor program is established to the point it no longer needs large infusions of research money.

In fact, Canada is only at the threshold of nuclear science, he said.

Liberal energy critic Russell MacLellan said the Tories are "hanging AECL out to dry" by cutting support to power-reactor development.

CZECHOSLOVAKIA

ANNIVERSARY OF CZECH NUCLEAR INSTITUTE

Prague RUDE PRAVO in Czech 5 May 85 p 4

[Article by Eng Miloslav Hron, CSc, Deputy Director for Research Institute for Nuclear Research in Hron near Prague]

[Text] The Institute for Nuclear Research in Rez near Prague was founded in June 30 years ago. That was after Czechoslovakia accepted the offer of the USSR government to extend assistance in the research on peaceful uses of nuclear power. From the original objective, basic research in the area of nuclear physics, its orientation gradually has been shifting to applied research, particularly in the nuclear power industry field. At present the Institute is the leading CSSR center for research and development of nuclear power systems and technology.

At the present time, we are coordinating five state and three departmental projects of research and development of technology in the nuclear power industry sectors, three state projects in nuclear technology, and we are also participating in the execution of three other state projects in the nuclear energy systems. For the manufacturer of nuclear equipment Skoda Plzen we are conducting irradiation tests on materials for reactor pressure vessels. The results of these tests are an essential basis for ensuring supplies of such equipment in our republic, for the Peoples' Republic of Hungary, and other socialist countries. On behalf of the state supervisory body for nuclear safety, the Institute performs specialized tests of safety regulations and production documentation of the nuclear power plants. We provide experts for reactor and power generating operations of the power plants, whose responsibility it is to take care of the specialized calibration and maintenance of the measuring systems of computers. We developed and standardized a number of computer programs which are essential for the development and control of production in nuclear power plants. We take part in the work for Jaslovske Bohunice, Kuvany, Mochovce, and Temelin. No less important for us is the fact that we have become the guarantor and designer of the technology for processing of nuclear waste for the Czechoslovak nuclear power plants.

In the area of physics research of the cores of constructed reactors, we turn over the results of our calculations to producers and operators and in the case of the newly built reactor LR-0, constructed in cooperation with USSR, we are concerned with the production physics of the core and questions of safety and reliability of pressure vessels of the power generating reactors.

In cooperation with the international economic association INTERATOM-ENERGO, the Institute has the responsibility of formulating Czechoslovak, as well as CEMA, standards for nuclear equipment.

A basic innovation, which nuclear power industry will have to adopt in the coming decades, is the introduction of so-called fast, sodium-cooled reactors, which use nuclear fuel to better advantage. For that reason the Institute will, in close cooperation with Soviet experts, coordinate and work on state projects for the development of science and technology directed toward developing sophisticated equipment for these reactors and their fuel cycle.

The industrial development of nuclear power systems and technology in our country is, as in the whole world, characterized by a rapid innovative process. It is therefore necessary to pay special attention to preparing a commensurate research and development base, directed toward the changing realistic needs of our national economy. What I have in mind is that we should carry out on a preferential basis those projects of an engineering nature which are to be put to specific uses, thereby endeavoring to lend an effective helping hand to the building of Czechoslovak nuclear power industry. This also stems from the fact that the Institute has been under the jurisdiction of the Czechoslovak Commission for Atomic Energy since 1972.

In the reactor physics research sector, our mission is explicitly defined, stemming from current needs of our nuclear power industry. Furthermore, the Institute performs the function of expert guarantor of Czechoslovak participation in both multilateral and bilateral technological cooperation with CEMA member countries in the physics research of nuclear reactors. The first stage of development of reactor physics in the Institute culminated in 1972 by putting in operation a heavy water reactor of zero output TR-0, which aided the research on the reactor core of the first Czechoslovak nuclear power plant A-1 in Jaslovské Bohunice. With the changed concept of our nuclear power system, basing it on water pressure reactors of the type VVER, the content of our research here also changed somewhat. We joined the integrated research into the physics of light water reactor core. We participated in the development of calculation programs, for example, in calculating the criticality and distribution of the neutron flux in the hexagonal geometry of the VVER reactor grids and of the fast reactors as well.

In the 80's the center of gravity has been shifting gradually even more toward the direct application of developed methods for reactor systems and reactors in existing power plants. The tasks of reactor technology are derived from the fact that construction of nuclear power plants in our country has become crucial. That forces us to give priority to concern ourselves with increasing the safety of such equipment. In the area of light water reactors, the research work concerns regimens of the primary radius, improving production conditions and their control and, most of all, questions of safety and reliability of nuclear equipment. We are carrying out research on reactor cooling water loops at the experimental VVR-S reactor, which provides valuable information for cooling water areas exposed to radiation. The research and development of fast reactors is being directed on a nation-wide scale by the Institute in the role of a coordinating work center. For example, together with the Soviet

Union we are directing our efforts toward optimizing the parameters of reactors, experimental research into the processes in fuel rods, etc.

The basic activity in the area of reactor materials is focussed on the service life, dependability and safety of those parts of the reactor which are most stressfully affected by radiation.

In our studies of fuel component behavior, our goal is to improve production effectiveness and service life, with special emphasis on the effects of flaws occurring during normal or temporary running of the reactors. In the case of construction materials, we review the effect of the production environment on the steel of the reactor pressure vessels, etc. Experiments are being conducted in the research reactor VVR-S. For designing production conditions we are constructing probes equipped with special instruments, which will allow long lasting exposure to radiation.

Another contribution of the Institute during the 30 years of its existence is the fact that it trained a number of experts who are now taking part in the construction of our nuclear energy systems in production machine tool factories, and in the designing, operating, and servicing of the power plants.

12605

CSO: 5100/3028

ARGENTINA

ALFONSIN ON NUCLEAR INDUSTRY

PY291232 Buenos Aires TELAM in Spanish 0028 GMT 29 Jun 85

[Text] Buenos Aires, 28 Jun (TELAM) -- President Raul Alfonsin this afternoon gave his full backing to the activities of the Argentine nuclear industry within the constraints of the economic conditions prevailing in the country. He said that it is very important to maintain the technological capabilities acquired by the country. Argentine Association of Nuclear Technology (AATN) President Raul Boix Amat made this announcement to the press assigned to Government House after meeting with Alfonsin. The meeting was also attended by other AATN members and by National Commission for Atomic Energy Chairman Alberto Costantini.

Boix Amat said that the discussion with Alfonsin focused on the future of the nuclear industry in Argentina, and that Alfonsin was asked to meet with private industrialists and investors interested in the nuclear field.

The members also asked that the forthcoming scientific meeting sponsored by the AATN for the second week of December be declared a matter of national interest.

In conclusion, Boix Amat stated that Alfonsin expressed his concern over the emigration of Argentine nuclear technicians whose level of training is appreciated throughout the world.

CSO: 5100/2130

ARGENTINA

PROPOSED LAW LIMITS NUCLEAR COMPONENT IMPORTS

PY220136 Buenos Aires NOTICIAS ARGENTINAS in Spanish 2010 GMT 20 Jun 85

[Excerpts] Buenos Aires, 20 Jun (NA) -- Civic Radical Union Senator Humberto Sigal, who chairs the Senate's Energy Committee, has admitted that a draft law that has been approved by the Senate and which limits the customs exemptions for the import of components for nuclear plants could possibly generate an acute controversy among the interested parties in the nuclear sector. The senator also confirmed that the draft law, which was approved during last night's session, 19 June, was proposed by Sigal himself without prior consultation with the National Atomic Energy Commission (CNEA) and in answer to the concern expressed by local suppliers through the Argentine Industrial Union (UIA) and the Argentine Nuclear Technology Association (AATN).

Sigal, who is senator for the province of Chubut, stressed that before proposing his draft law he conducted a survey to see whether Argentina's industrial sector has the capability to supply locally manufactured components to the Atucha II nuclear plant and the Arroyito heavy water plant and he stressed that he had confirmed that there is "a magnificent development that can look after our needs." He mentioned only the firm of Pescarmona Metallurgical Industries without going into more details.

The draft law that has been approved by the Senate, and which must now be debated in the Chamber of Deputies, limits the scope of the customs exemptions for the import of material and services for Atucha II, which is located in Lima Province of Buenos Aires, and the Arroyito heavy water plant, which is located in the Province of Neuquen. The customs exemptions were approved in 1980 through Law No 22,268 and Decree No 1,337-80 for Atucha and through Law No 22,249 for Arroyito.

Restrictions to the exemptions includes the "material and services that, although provisions have been made for their importation, can possibly be replaced with an equivalent component of local manufacture if the national industrial and engineering sectors increase their capabilities within a time frame compatible with the effective progress of the projects."

CSO: 5100/2126

ARGENTINA

CNEA HEAD ON ATUCHA II PLANT, OTHER PROJECTS

PY011852 Buenos Aires NOTICIAS in Spanish 2217 GMT 29 Jun 85

[Text] Buenos Aires, 29 Jun (NA) -- Alberto Costantini, chairman of the National Atomic Energy Commission (CNEA), today indicated that it "would be difficult" to set up a joint enterprise, particularly with the participation of foreign capital, to own and exploit the Atucha II nuclear power plant. Costantini also revealed that the possibility of allocating part of the ammonia output of the Arroyito heavy water plant for the manufacture of fertilizer is being studied.

Costantini announced that on 1 or 2 July he will meet with Finance Secretary Mario Brodersohn to establish "the new economic guidelines" for the budget of the nuclear sector and that on 5 July President Raul Alfonsín will hold talks with a delegation of the German corporation Kraftwerk Union [KWU] to discuss the construction delays on Atucha II. Costantini told NOTICIAS ARGENTINAS that the government is "very satisfied with German nuclear technology because of its high level of development and with the relations we maintain with the KWU, the corporation building Atucha II."

Asked about Senator Antonio Berhongaray's draft bill to "set up a mixed corporation made up of Argentine and foreign suppliers that would own and exploit the Atucha II power plant," Costantini answered that he did not know anything about this proposal. He made it clear that in order to comment on the draft bill "one would have to study it in depth," adding, however, that "this type of exploitation of a nuclear power plant would be very difficult."

Costantini said that this ownership and exploitation formula has never been implemented "in the nuclear or any other electric energy field. The standard approach has been, so far, state ownership." Nevertheless, Costantini added that in keeping with the president's desire to "leave national growth in the hands of the private sector," the CNEA had called for bids for the agency's special alloy factory in Ezeiza.

He stated that during the meeting which Alfonsín yesterday held with Raul Boix Amat, secretary of the Argentine Nuclear Technology Association, the chief executive promised to attend a scientific meeting of this organization that will be held in Buenos Aires during the second week of November. He added that on that date Alfonsín will meet with some 40 or 50 businessmen of the private nuclear-related enterprises.

Asked about the possibility of using part of the ammonia produced by the Arroyito heavy water plant in Neuquen, to manufacture fertilizer, Costantini admitted that some projects in this regard were currently under study and that this "could be an excellent

solution to the shortage of fertilizer in Argentina." So far, the government has disclosed projects to build fertilizer factories in Bahia Blanca and Neuquen. Costantini explained that a unit to manufacture fertilizer could be built in Arroyito, would be inexpensive, and could be operational relatively soon. Costantini stressed that the production of heavy water "would not be affected" by this new development and said that if approximately \$200 million were to be invested in the next 2 years, the Arroyito plant could be dedicated by the end of 1986 or the beginning of 1987 because "it is 85 percent completed right now." He pointed out that the project to produce fertilizer will first be discussed with Neuquen Governor Felipe Sapag, lawmakers, and other officials involved in this project. Costantini concluded by stating that the "CNEA's experts will be retained and that production of radioisotopes for peaceful purposes will continue" despite the austerity policy.

CSO: 5100/2130

ARGENTINA

COSTANTINI EXPLAINS CNEA'S DIFFICULTIES

Buenos Aires LA RAZON in Spanish 26 May 85 pp 6-7

[Exclusive interview of CNEA head Alberto Costantini with LA RAZON, by Norma Nethe; date and location not specified]

[Text] [Question] Among the budgetary provisions submitted by the Commission, in view of the delay in payment to suppliers who, in many cases have not yet been paid for December, are there plans to regulate those payments?

[Answer] There are two different problems. The payment to the suppliers is of a financial type, the one involving the budget is economic. In 1984, a program was carried out based on loans assigned by the executive body, charged to the budget, and the funds did not arrive on time; hence the payments were left virtually frozen. Unfortunately, last year the low level of cash flow generated for the state a domestic debt of about \$400 million, which must be dealt with in order to be able to continue with partially halted projects. President Alfonsin, in agreement with the minister of economy and the Chamber of Construction, has authorized a program for paying these debts, which also entails acknowledgment of a method for restoration based on higher costs, not called for in the Budget Law. For this year, once the budget has been approved, the flow of funds should be parallel to the loans, so as not to generate more debts.

[Question] During January, you estimated that the requirements for 1985 would be \$550 million as a minimum. Eventually, what was submitted to Congress was a sum of \$420 million, 20 percent less. Is Congress discussing how the budget items will be distributed so as to be able to complete Atucha II in 1990 and Arroyito in 1987, without halting the rest of the projects and research? You have stated publicly that the generation of nuclear electric power ranks last in your priorities.

[Answer] That analysis was made repeatedly among the Secretariats of Finance, Energy and Planning, and by the minister of economy himself. It had not yet been resolved when the circumstances (I am referring to the cabinet change) altered the time periods. But the fact that the budget has not yet been approved has an additional effect: At the end of the first half, CNEA [National Commission for Atomic Energy] will have used only 20 percent of it, leaving

for the second half an available sum of 80 percent, which will allow for an improved work pace. This has resulted in the fact that the budget problem, to some extent, will be compatible with the progress of the projects, after a period of stagnation. I shall tell you that the solution that is being achieved is to some extent a result of the low investment. As for the distribution of the budget items, the discussion is being held on the ministerial level. I can say that, for the present, it is not an issue for congressional debate. The Congress distributes complete sums based on sections.

[Question] How will the planned 12 percent cut in expenses decided by the executive body affect the delay in Atucha II?

[Answer] To answer that question, I would have to have better information on the budget that will be approved and, in particular, on what the updating index will be. When I learn the amounts, I shall know the rate. First, I have to find out when the old debt is going to be paid, and then, what the cash flow ordered will be. The business firms need to be equipped and to purchase materials, and for that they are demanding a timetable that we can only provide with information on these factors. I can say in advance that, with this year's delay, the project will cost four times the initial plan. With that, we shall be proceeding toward mid-1991.

[Question] If, as you have claimed, the priority for the current CNEA leadership is human resources (with their fund requirements so as not to halt or lose the research under way and hence cause emigration of scientists and technicians), what will happen to the nuclear industry if the erosion of the nuclear electric projects is not reversed?

[Answer] If there is no money to lend those projects a fast pace, the nuclear industry will suffer slightly, but the same thing would happen to the entire construction industry, and that would not take anyone by surprise. I don't see how the nuclear industry can extricate itself from a state of affairs that is affecting the country as a whole. Sixty percent of a nuclear power plant is conventional works, and if Atucha II were to be stopped it would affect the industry as much as if the same thing happened to the Piedrabuena power plant in Bahia Blanca, which is a coal plant. The firms responsible for the heavy components, such as Pescarmona or Cometarsa, have not been operating for 2 or 3 years, owing to cash flow problems; and they were making almost conventional elements. I assure you that the companies have been engaged in different things, without thereby losing technology.

[Question] What will the final cost of Atucha II, originally budgeted at \$1.5 billion, be?

[Answer] I don't think it would be rash to talk now about a sum of from \$4.2 to \$4.5 billion, or even more. This cannot be determined exactly until the project is finished, considering the presence of unproductive costs the effect of which is impossible to determine until then.

[Question] The original timetable for imported supplies was retained for the most part, owing to the long periods in advance with which they must be ordered. According to the company which received the award, goods and supplies have already been shipped covering a third of the 1980 contracts (in other words, a sum of \$500 million marks), and the bulk of the equipment will be ready in 1986. If that 1980 contract called for the payment of the loan granted by the German banks for the imported portion (900 million marks in 1979 in equipment and 200 million in services), in 30 half-yearly installments starting 6 months after the powerplant goes into service (payable with the energy produced by it per se), and if it was accepted, with Kraftwerk Union (supplier and partner) that Atucha II has been delayed 3 years until recently, and now for 4 years, were the German banks asked for a proportionate extension to start paying for the loan? Our sources report that this was not the case, and they attribute it to inefficiency on the part of the CNEA administration when it was time for the delays to be institutionalized in 1982.

[Answer] The volume of equipment delivered is far less than what you mentioned, and the services were supplied partially, as they were requested. There is a considerable portion of equipment which is now ready and which was not delivered for technical reasons that can be accounted for, and because the national business firms are not in a position to undertake its installation, given the current status of the projects. As for the loan granted by the German banks, KWU is concerned with that and, of course, it is quite well informed on everything that is happening, and knows what to do with the financial portion. The technical director of ENACE [Argentine Nuclear Enterprise for Electrical Power Plants] (the mixed company responsible for the projects) is our representative with the Germans, so that it is impossible for the banks not to know what is going on in Argentina. Their informants have certainly caused it to lapse into a misunderstanding. I can say that there is a KWU proposal to act as intermediary in search of the bridge-type financing that would make it possible to transfer the group of components worth \$100 million held in the port of Hamburg.

[Question] The next question that I shall ask you is associated with a debate that has been under way within the CNEA, virtually since it came into existence, between researchers and implementers. How would it be possible to continue with the research so as not to lose the level attained in 30 years and, at the same time, provide the industry with a power plant construction plan that would encourage it to continue investing? What would the plan be? Will the fourth power plant be built or not, and when?

[Answer] Although I should not answer categorically, because there is not yet any official thinking on the matter, I would tell you that, in the first place, the 1977 Executive Branch decree which stipulated the building of six nuclear power plants (three more after Atucha) up until the end of the century, has not been abrogated. In this connection, the studies made by the Secretariat of Energy lead one to believe that, by that date, 1,200 MW will need to be installed; apart from the nearly 1,800 that will be acquired when the power plant currently under construction is put into service. What has to be decided

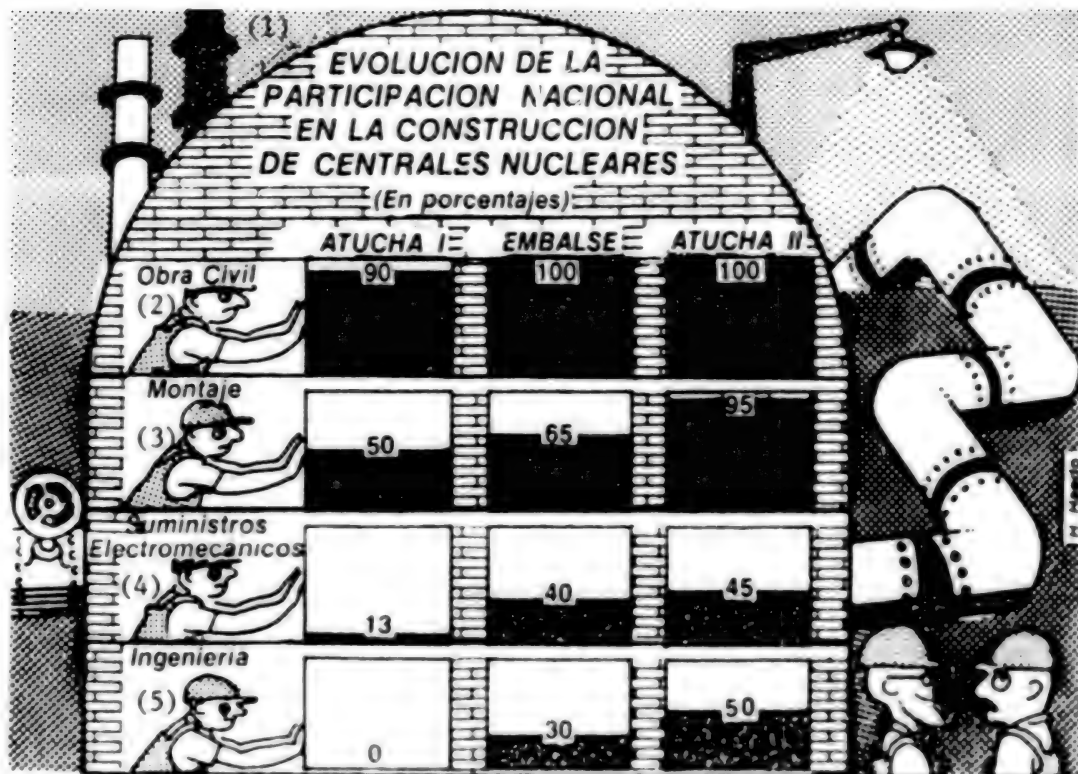
now is the module of the one or more power plants; and for this, a political analysis rather than an economic analysis must be made. The debate is posed between those who claim that power plants with a power of 300 MW have more export potential, and those who think that this would cause a rise in cost of between 20 and 40 percent for the power producer, depriving the nuclear type energy of competitive status with respect to other types of electrical generation. But the 1,200 MW have not been decided, nor has it been decided how many power plants will be required to generate them. And the Nuclear Plan has not been revoked either. What is virtually certain is that, through consecutive modifications, its fulfillment will have to be extended until 2010.

[Question] I thank you very much for the extensiveness of your responses....

[Answer] Before concluding, I should add something that I consider very important, to remove a certain amount of pessimism that I perceive in you. I wish to state that CNEA is working with the same vigor and enthusiasm as ever, and that there have been no problems relating to the scientific and economic development of the plans that are any greater than others which have arisen previously. Now, we have to bridge a gap, so as not to impair the company's progress: with regard to the pace of the work, which was already delayed previously, we have contributed only a small grain of sand. I would point out to you that the present situation cannot be blamed on a particular state of mind among the executive body regarding CNEA, but rather on the progress of the nation's economy.

Sketch Caption:

The construction of the Atucha I nuclear power plant (in operation since 1974) enabled the country to initiate its industry in that field, through a 40 percent share in the value of the power plant, although the nuclear portion was purchased on a turn-key basis from the German firm Kraftwerk Union, AG. In the first place, it allowed the CNEA personnel to acquire experience in running power plants; a process which became intensified during the phase of the Embalse project, in Cordoba. That power plant (put in the critical state in 1983) demonstrates the increased share for the National Commission for Atomic Energy, in acting as a principal subcontractor in the nuclear portion and the installation. For Atucha II, this progress shifted the balance toward the abandonment of the turn-key contracting system, with the creation of ENACE, Inc, with a majority share for CNEA (75 percent) and KfU (with 25 percent of the assets, declining until it reaches 0 percent at the termination of the contract). ENACE assumed the duties of an industrial architect, and it is noteworthy that the development achieved in the area of nuclear fuels caused the establishment of a joint-venture entity with the Germans to supply the first core of the reactor.



La construcción de la central nuclear Atucha I — en operación desde 1974 — permitió al país iniciar a su industria en el tema a través de una participación del 10% del valor de la central, viéndose la parte nuclear fue adquirida llave en mano a la alemana Kraftwerk Union A.G. Permitió, en primer lugar, adquirir experiencia de manejo de centrales al personal de CNEA, proceso que se acentuó durante la etapa del proyecto Embalse, en Córdoba. Dicha central — puesta a crítico en 1983 — muestra el aumento de participación de la Comisión Nacional de Energía Atómica al actuar como subcon-

tratista principal en la parte nuclear y en el montaje. Para Atucha II, tal evolución inclino la balanza hacia el abandono del sistema de contratación llave en mano, creándose ENACE S.A. con participación mayoritaria de CNEA (75%) y KWE (25%) en valores decrecientes hasta alcanzar 0% al término del contrato. ENACE asumió las funciones de arquitecto industrial, y es de señalar que el desarrollo alcanzado en el campo de los combustibles nucleares hizo que se constituyera una joint venture con los alemanes para la provisión del primer núcleo del reactor.

Key to Sketch:

1. Progress of the Native Share in the Construction of Nuclear Power Plants (in percentages)
2. Civil construction work
3. Installation
4. Electromechanical supplies
5. Engineering

2909

CSO: 5100/2123

ARGENTINA

CNEA'S LICENSING COMMISSION CHIEF ON SAFEGUARD NORMS

Buenos Aires LA RAZON in Spanish 26 May 85 pp 6-7

[Text] Following a certain amount of decline in the rate of building nuclear power plants which occurred at the beginning of the decade, due primarily to the pressure from ecological political groups which forced their countries to impose more obstacles to the licensing of new power plants, an opposite trend is taking place now, with forecasts calling for nuclear power to have a 31 percent share of all the electric power generated by 1992. In 1978, the portion was 10 percent, a figure around which the current nuclear electric generation in Argentina is revolving.

The National Commission for Atomic Energy (CNEA) is responsible for radiological control and nuclear safety, through an ad hoc management. LA RAZON interviewed the official in charge of this area, Dan Benison, to question him about the feasibility of having the agency responsible for operating the facilities serve, at the same time, as the one controlling them. The developed countries have, for some time, separated these functions. In the United States, this was done 10 years ago, when the Nuclear Regulatory Commission was created. Dan Benison also heads the International Commission on Radiological Protection, a non-governmental agency which prepares safeguard norms, with the participation of 13 countries.

"The Advisory Council for Licensing Nuclear Facilities (CALIN), which I chair in Argentina, is a separate agency within the CNEA, which has policing authority, serving as an umbrella covering the entire system, since 1974. Our authority for intervention is absolute; if we consider it necessary to shut down a power plant, we do so."

[Question] What features do the Argentine licensing norms have?

[Answer] Argentina has a set of norms based on the recommendations of international agencies. Every country makes its own, but the goals are the same. Our facilities apply criteria very similar to those of Sweden, insofar as the radioactive area is concerned; and in some respects it might be claimed that they are more stringent than in other countries. For example, Atucha II will be the first power plant to retain the isotopes from carbon which, up until now, have been released into the atmosphere. The engineering problems in

the Argentine power plants have been solved based on the German and Canadian system, and also our own. Many of the specific norms were adopted simultaneously with those devised by the International Atomic Energy Agency.

[Question] What is the mechanism whereby the CALIN establishes its conditions?

[Answer] It is a two-way mechanism: On the one hand, a facility is proposed, and, on the other, we impose requirements and make recommendations. It is an interactive licensing system, because it would be foolish to let things go and, later, refuse permission to operate.

[Question] With regard to the violation of safety norms, or the decline in security, out of habit, which takes place in all dangerous activity, doesn't the controlling agency suffer pressure from the operators who, for example, want to continue keeping their power plants in service for economic reasons?

[Answer] The license puts it in writing: The one with primary responsibility for the power plant is its director, and he usually takes it out of service. To be sure, he will have to give his reasons later. The few instances in which we had to intervene related precisely to the breakdown in security and, I reiterate, they were but few. As for the conflict of interests, that is inconceivable.

[Question] Then why have the countries in the forefront, once they have reached that point, separated the two functions?

[Answer] There is a great debate concerning whether or not this is feasible. A great influence is wielded here by the use of the capacity of its own that the atomic agency has on other sectors, for checking purposes. We think that the one who licenses, and also knows how the facility was built, knows more than the one viewing the situation from outside. If all the technical capacity could be doubled, as in the United States (where, incidentally, I think the control worked better previously), it could be separated from the agencies. In India, a country ranking among the greats, that separation has not worked.

2909

CSO: 5100/2123

ARGENTINA

COSTANTINI ON ALLOCATIONS OF CNEA FUNDS

Buenos Aires LA NACION in Spanish 3 Jun 85 p 8

[Article: "Costantini States That Nuclear Sector Not in State of Crisis"]

[Text] San Carlos de Bariloche--Alberto Costantini, the president of the National Commission for Atomic Energy (CNEA), has denied that nuclear energy policy is in a state of crisis, although he recognized that there have been some delays, as in the case of construction of the Atucha II nuclear electricity generator, which is now semi-paralyzed.

Defining the present policy of the CNEA, Costantini stated that scientific research, the training of professional workers, and the use of nuclear energy for peaceful purposes--as well as its application to medicine and to industrial development--"should be considered, now more than ever, priority aspects of our program."

The official spoke in this way about the situation which atomic energy is going through in Argentina. He also referred to its prospects after the principal events were held in Buenos Aires celebrating the 35th anniversary of the CNEA, as well as National Atomic Energy Day and the 30th anniversary of the establishment of the Balseiro Institute, which President Raul Alfonsin attended.

The statements made by the president of the CNEA, together with indications in comments by the chief of state, confirmed the fact that the economic restrictions imposed on the public sector will also affect the budget in the field of atomic energy.

Costantini recognized that the delay in the approval of the budget for this year will have a negative impact on the continuation of work undertaken by the CNEA, due to the high financial cost involved.

Nevertheless, he emphasized that the CNEA will set its own priorities in the use of the funds provided to it.

He added: "Our intention is that nuclear energy will be converted into a factor of state power and that, on the contrary, will be used in the service of humanity." He gave as examples the use of radioisotopes as applied to medicine, biology, and genetics.

In reply to a question, the president of the CNEA stated that both in the case of nuclear electricity generating stations, "which now provide about 11 percent of national electricity production, as well as in the fuel cycle, progress made for the moment will be limited to the field of concrete realities."

Nevertheless, he indicated that this should not be considered "abandonment of the goals established" for Argentine nuclear development. He rejected the view that atomic policy is in a state of crisis, claiming the achievements recorded up to now highly encouraging.

Atucha II

After saying that construction activity at the Atucha II nuclear electricity generator is semi-paralyzed, Costantini explained that once the budget has been approved and the rate at which the CNEA will receive its funds has been determined, a process of renegotiations can be undertaken with the contractors and sub-contractors. It will then be possible to rearrange the time schedules for the various work to be done.

He also emphasized the agreement signed with Algeria under which Argentina will soon deliver to that African country an RA-6 research and teaching reactor, similar to the one which has been in operation in the Balseiro Institute since October 1982, using 20 percent enriched uranium produced in Argentina.

Finally, Costantini denied newspaper reports according to which Argentina will transfer nuclear fuel to Algeria at the same time that delivery is made of the research reactor. He insisted on pointing out that such a possibility could not be considered, at least in the near future.

5170

CSO: 5100/2117

ARGENTINA

CNEA EMPLOYEES CRITICIZE MANAGEMENT, PLANS

PY070315 Buenos Aires DYN in Spanish 1311 GMT 6 Jun 85

[Text] Buenos Aires, 6 Jun (DYN) -- Employees and technicians of the National Atomic Energy Commission (CNEA) who are members of the Association of State Workers (ATE) have reported that the national executive branch is being victimized by "international pressures" which have prevented it from sending to Congress the draft nuclear bill "prepared by working groups of the ruling party more than 1 year ago." The workers also criticized "the lack of consistency in CNEA's plans," and said that this organization is engaged in a "battle over costs with enterprises in this sector, when the true battle that must be waged is the one against technological dependency." The communique of CNEA workers was released today on the occasion of CNEA's 35th anniversary. It pointed out that the organization is currently "experiencing one of the most difficult periods in its history," because of the "country's economic crisis, international pressure, the unclear policy of the government, the speculative attitude of certain lawmakers, and a management which has been unable to overcome all these obstacles and has succumbed to the crisis." The communique states that "there is a lack of democratic participation" within the CNEA and denounced the "authoritarianism and arrogance" of the management and the "voracity of a group of firms whose only concern is to keep the nuclear deal going." It added: "The stagnation of plans for independent technological development in the nuclear field" is one of the aspects of CNEA's crisis. The communique questioned "the continuity of a plan of tasks and projects of doubtful usefulness for the country under the present circumstances." The communique criticized the creation of corporations like the Argentine Nuclear Enterprise for Electrical Power Plants which "have not only failed to manage or execute projects but have become liaison organizations for a group of corporations for the benefit of the latter, thus forsaking the objectives initially set for them." The paper emphasized the need to carry out "policies capable of consolidating all the achievements and making use of them for the attainment of significant goals aimed at self-sufficiency in the nuclear field." The workers also called for a "review and abrogation of all contracts harmful to national interests," for the "adjustment of tasks and projects to the nation's needs and possibilities," and for "congressional debate on legal instruments which set the rules for this activity."

CSO: 5100/2121

BRAZIL

EMFA CHIEF COMMENTS ON PRODUCTION OF NUCLEAR BOMB

PY241848 Sao Paulo O ESTADO DE SAO PAULO in Portuguese 22 Jun 85 p 2

[Excerpts] Brasilia--Although recognizing that the resumption of relations between Brazil and Cuba "is a diplomatic and political issue that falls within the jurisdiction of the president of the Republic and of Itamaraty," Admiral Jose Maria do Amaral, chief of the Armed Forces General Staff [EMFA], said yesterday that he favors a review of this issue. He said: "If there are economic and diplomatic reasons that would justify it, I believe that the subject must be reviewed and relations resumed."

Amaral opposed the proposal made by Deputy Helio Duque (Brazilian Democratic Mobilization Party, Parana State) that the new constitution include a clause banning the production of a nuclear bomb in the country. Amaral said: "I believe we do not have any reason to produce the bomb now. But why are we going to impose restrictions on ourselves for the future? No one can foresee the future." In the opinion of Admiral Amaral, other nations have developed nuclear weapons so there is no reason for Brazil to state "that it will not do this or that." He noted that Brazil has not signed the Nuclear Nonproliferation Treaty and that today the two superpowers can blow the world apart several times in a few seconds.

CSO: 5100/2128

BRAZIL

REPLACEMENT OF FRG NUCLEAR EXPERTS PROPOSED

PY241910 Rio de Janeiro O GLOBO in Portuguese 22 Jun 85 p 18

[Text] The government's failure to make a decision on the Brazilian nuclear program could jeopardize the transfer and absorption of German technology and could delay Brazilian independence regarding energy production. This is the main conclusion of a study conducted by the Association of Employees of Nuclebras Engineering, Inc (Nuclen). In this study, the Nuclen employees demand that Nuclen be reorganized in such a way as to allow local experts to replace foreign technicians in the nuclear projects under way. The Nuclen employees propose that the Germans be immediately removed from all financial and technical executive positions and be assigned only administrative duties.

Everton de Almeida and Canrobert McCormick, leaders of the association, believe that the government's decision will cause the flight of more experts trained in Germany at a cost of DM 400,000 each (more than 800 million cruzeiros). This, they said, will cause further delays in our process of absorbing German technology.

CSO: 5100/2125

BRAZIL

DISCUSSION ON PROGRAM TO REOPEN DURING FRG ENVOY'S VISIT

Brasilia CORREIO BRASILIENSE in Portuguese 5 May 85 p 14

[Excerpt] The minister of economics of the Federal Republic of Germany (FRG), Martin Bangemann, will be in Brasilia next week, the 15th and 16th, to learn the new outlook of the Brazilian Government on trade, finances and investments. The nuclear agreement is another important topic on the agenda of the representative of the Bonn government, which is awaiting a definition from the New Republic regarding Brazilian nuclear policy.

No less than five ministers of state—Francisco Dornelles (finance), Joao Sayad (planning), Roberto Gusmao (industry and commerce), Olavo Setubal (foreign affairs) and Aureliano Chaves (mines and energy)—in addition to the president of the Central Bank, Antonio Carlos Lemgruber, received requests from the FRG Embassy for meetings with the German minister of economics.

Bangemann, who is scheduled to be received in special audience by President Jose Sarney, replaced Count Otto Lambdorff—considered the czar of the German economy and the principal architect of West Germany's recent economic recovery—in July of last year when the count resigned his position in order to defend himself from the charge of bribery and corruption in the much discussed Flick case.

According to the economic trade profile prepared by the Foreign Ministry, West Germany is Brazil's third trade partner after the United States and Japan, the first purchaser within the European Economic Community (EEC) and has \$3.5 billion invested in Brazil.

This will be the first meeting between ministers of Brazil and Germany after the inauguration of the new government. The Germans regretted not having been agile enough to have included Bonn in the itinerary of visits which President Tancredo Neves made to various European countries. Foreign Minister Hans Dietrich Genscher was in Brazil for the inauguration ceremony and invited Foreign Minister Olavo Setubal to visit Germany this year.

Last month, the statement of Mines and Energy Aureliano Chaves on the redefinition of Brazilian nuclear policy disturbed Bonn political and business circles. Aureliano announced the creation of a special committee

to deal with the nuclear problem and only after its report has been completed (within a period of 3 months) will he be able to define the timetable for implementation of the agreement signed with West Germany. Meanwhile, he pledged to proceed with the Angra-I, II and III projects.

The spokesman for the German Embassy, Gunter Schutze, pointed out that the nuclear agreement signed in 1975 does not establish the number of plants. Therefore, any modification in the implementation of the plans to meet Brazil's energy needs according to its financial circumstances does not imply a revision of the agreement.

8711

CSO: 5100/2109

BRAZIL

PROBLEM IN GENERATOR HALTS ANGRA I OPERATION

Sao Paulo O ESTADO DE SAO PAULO in Portuguese 21 May 85 p 39

[Text] The Angra I nuclear plant was shut down again last Sunday, because of a problem in one of the emergency diesel generators. In a routine inspection, metal particles were discovered in the oil, indicating a worn part and requiring a minute examination of the bearings, the advisory staff of Furnas Power Plants reported yesterday.

Furnas does not know how long the plant will be idle, because the company must now await the arrival of technicians from the United States, from Fairbanks Morse, the firm which manufactured the generator, to analyse the problem and indicate the solution. Angra I was in operation for the first 3 months of this year and generated 1,007,570 megawatts for the Southeastern Region power system; it was shut down for 18 hours on 10 April for a routine inspection of the refrigeration pumps.

The Angra I nuclear plant cost the nation's treasury \$1.8 billion and presents a very high cost of \$2.80 per kilowatt generated. Furnas technicians estimate that another \$300 million in investments is needed to keep the plant operating normally. The equipment is already showing premature wear, which is hampering its performance. Although the Angra I plant is essential to insure the reliability of the Furnas system, it is still operating under what the technicians themselves call the "firefly" system, or on and off.

Regarding this latest problem, Furnas reports that Angra I has two emergency diesel generators, to supply power for the auxiliary system to cool the core, but this power source is only activated if there is a failure in the other two sources of energy, i.e., supplied by the primary generator or from the outside.

Although these generators are the third backup for the same situation, the technical specifications for Angra I determine that the plant must be shut down within 48 hours if any one of these generator groups is not available. According to Furnas, all these measures were taken and now they are simply waiting for the arrival of the U.S. technicians.

BRAZIL

LOCAL RESIDENTS COMMENT ON IPEN ACTIVITIES

Sao Paulo FOLHA DE SAO PAULO in Portuguese 11 May 85 p 24

[Article by Leila Reis]

[Text] "I know there is a company there." "No, it's some kind of animal hospital," argued Irineu Lopes Gomes, aged 8, and Neusa Rodrigues, 10, who live in the San Remo "favela" [shantytown] neighboring the rear of the IPEN (Institute of Energy and Nuclear Research), located within the USP [University of Sao Paulo] campus in University City in the southern zone of the Sao Paulo capital. IPEN is conducting nuclear energy research which could provide Brazil with its own atom bomb in the 1990s, but its neighbors know very little about it.

Installed in a huge area at the rear of University City, IPEN is surrounded by the institutes of Physics, Biological Sciences and Biomedical Sciences, the School of Dentistry, the University Hospital, the San Remo "favela" and the Municipal Building of University City. The USP's jogging track and athletic field are also close to IPEN's entrance.

Despite every precaution to prevent strangers from entering the area of the IPEN installations (the institute is surrounded by a barbed wire fence and has guards stationed almost everywhere), the children of the San Remo "favela" are accustomed to go inside the area to play. They demonstrated this to FOLHA's reporter.

"But no one has any idea what goes on in the 20 some buildings which can only be entered by IPEN officials, who must also be signed out," reported a secretary who works in the Physics Institute, located near IPEN's main entrance.

Everyone knows that entry into that compound is prohibited, even to the children. "The other day some little boys were playing near the fence and the guard began to fire into the air," reported Jovelita Pinto de Oliveira, aged 11, who lives in San Remo.

Chasing Balls

Even so, many unauthorized people enter the area. "Some kid is always going after a ball that goes in there, and adults too. But I know it's prohibited,

said Joilson Americo Novaes, aged 36, the owner of a bar that faces on the IPEN compound.

The bar keeper has heard that in IPEN "they fool around with atomic energy; I think they are building a bomb," but it doesn't mean much to him. "No one has ever scared me!" He also explained what could happen if there were an accidental explosion. "There would be a hole in the ground big enough to drive a truck through."

Contrary to what Joilson believes, an accident in the installations of his neighbor--IPEN--would not just make a big hole in the ground. If anything went amiss in the research conducted secretly inside IPEN, the consequences would be much worse, not only for the "favela" residents but for a much wider radius.

In IPEN's Metallic Materials Division, technicians and scientists are working on a project known as "Cometa" (combustible metal), to produce metallic uranium bars which, in Brazil, could only be used to produce plutonium (component of the atom bomb), because the country does not have "heavy water" reactors which use plutonium as fuel.

The greatest danger is concentrated in the Reprocessing Division of the Department of Chemical Engineering, where this metallic uranium (produced by the Cometa project) is reprocessed to extract the plutonium. This process is potentially dangerous because it uses highly unstable organic solvents (tributyl phosphate). This means that if there were an accidental chemical explosion, the region within a 24-km radius would be totally contaminated, with unforeseeable consequences.

"They Can't Lean on the Fence"

A group of women who live in the San Remo favela do not know what IPEN is about, either. They all talk about a "company" which guards its installations very closely. "They don't even let the kids lean on the fence," declared Maria Iralda Nascimento, aged 25, who has been living here for 5 years.

Told that the "company" is conducting studies to build an atom bomb, Maria Iralda was startled. "In there? Imagine it, how can they be doing that here, where so many people are living?"

Unlike Maria Iralda, athlete Cicero Vitorio do Santos, aged 25, who trains every day on the jogging track that circles the USP park, thinks it is "natural" that an atomic device would be built in an area near the running track. "All the countries already have the bomb, so why shouldn't Brazil? This is not surprising any more," he said.

Another young man exercises daily in the same place. Roque Pereira dos Santos, aged 31, who works at the IPT (Institute of Technological Research), which also operates on the USP campus, said he knew about "the nuclear plant they are making there, but my colleagues at the IPT assure that it is not dangerous, since it is just a 'rehearsal' for the bomb."

Eugenio Carlos Santos Borges, aged 22, is another amateur athlete, who is now very sweaty after an hour of running. He knows what IPEN is doing: "They are studying types of soils to build mud houses with."

No Comment from Physic Professors

In the past, the Physics Institute of the USP, located to one side of IPEN, has conducted joint projects with IPEN's predecessor, the IEA (Atomic Energy Institute), which supplied the radioactive materials for use by the Department of Experimental Physics. Physics Institute professors also conducted nuclear physics experiments in the IPEN reactors. According to Ernst Hamburger, aged 51, chairman of the Experimental Physics Department, he does not know if there are any ties between the two institutes today.

In any case, the possibility of cooperation with IPEN could not be confirmed because Professor Luis Guimaraes Ferreira, director of the Physics Institute, refused to grant an interview to FOLHA.

Plutonium for Bomb

There is no doubt that, on the premise that Brazil must possess the complete nuclear fuel cycle (uranium enrichment) and build at least one bomb for the sake of "international prestige" (as FOLHA reported on 28 April 1985), there are sectors in Brazil which are studying nuclear energy for military ends.

To produce an atom bomb, the country must obtain one of three fissionable elements: uranium 233, uranium 235 (both highly enriched) or plutonium 239. Because uranium 233 is the isotope found less often in nature, little research is conducted with it. In the present stage of Brazil's scientific development, uranium enrichment based on 90 percent of its 235 isotope has been demonstrated to be a poor option, for two reasons: it is more difficult to reach critical mass with U235 than with plutonium 239 (in other words, it takes three times the mass of uranium to produce an explosion with the same force as that obtained with plutonium) and the existing technology to obtain enriched uranium (by gaseous diffusion) is extremely complex, and only a few countries have mastered the process.

Thus, a U235 atom bomb would be technically and economically feasible only if uranium enrichment by the laser method is successful. Research on laser enrichment is being conducted at the Institute for Advanced Studies of the CTA (Aerospace Technology Center); however, in an interview with FOLHA (28 April 1985), Air Force Maj Gen Hugo Piva reported that the process will not be mastered within this century.

Hence the shortest path would be to obtain plutonium through a program aimed directly at its military application, because it is much more expensive and complex to carry out a nuclear program to obtain plutonium from nuclear power plants. This is one reason why many countries opted to build reactors whose only purpose is to produce plutonium.

One of the main difficulties in obtaining plutonium from nuclear reactors is that, for the bomb, the plutonium must have a high concentration of its lighter

isotope (239) and hence a low concentration of its heavier isotopes (240 and 241). The process used is to expose the element to neutron radiation for a very brief period. In other words, it is necessary to retire the fuel [rods] so frequently as to make the reactor impractical for electric power generation. All the light water reactors (with the exception of the Canadian Candu) present this problem.

6362

CSO: 5100/2115

BRAZIL

BRIEFS

NUCLEBRAS PRIORITY--Brasília--The new president of the Brazilian Nuclear Corporation (NUCLEBRAS) (already appointed by decree of President Jose Sarney but has not yet been installed), Licinio Marcelo Seabra, said yesterday that the company's priority will be to conclude the Angra-II nuclear plant project. According to him, the other projects in the nuclear area will be the subject of a study of priorities still to be carried out. Licinio Seabra declared, however, that the companies connected with NUCLEBRAS already in operation cannot be deactivated considering the high investment made in them. "Nuclebras Heavy Equipment (NUCLEP) is operating with idle capacity and we will have to find markets to reduce that idleness," he declared. With regard to the need of funds for the sector, in the order of \$800 million per year, Licinio Seabra said that he will have discussions with government authorities and also receive the directives of Minister Aureliano Chaves. [Text] [Sao Paulo FOLHA DE SAO PAULO in Portuguese 2 May 85 p 10] 8711

NUCLEBRAS DIRECTORATE--The new president of NUCLEBRAS, Licinio Seabra, made only three changes in the make-up of the board of directors of that state enterprise, keeping the other three directors. He also kept the directors-superintendents of the five subsidiaries. Remaining are the director-superintendent, General Jose Pinto Rabello, and the directors of the mineral area, Paulo Lima, and of supply, Jarbas Novaes. [Text] [Rio de Janeiro O GLOBO in Portuguese 14 May 85 p 19] 8711

CSO: 5100/2109

CHILE

DEFENSE MINISTER RULES OUT NUCLEAR PROLIFERATION

PY092334 Santiago EL MERCURIO in Spanish 31 May 85 p C 1

[Text] "After 17 years, the Tlatelolco Treaty, which proscribes the nonpeaceful use of nuclear energy in Latin America, leaves the impression of just being an agreement with good intentions." This statement was made by Defense Minister Rear Admiral Patricio Carvajal Prado when asked his opinion of a news agency report published yesterday that Argentina has come closer to manufacturing its own nuclear bomb.

Through an official spokesman, Carvajal said that the treaty has been open to signature since 1967 and that Argentina has not signed it yet. He added that Brazil has endorsed and ratified it without exception [sin dispensa]. "That is, it will only do so when all the countries of the region ratify it themselves. [sentence as published] Argentina, likewise, has stated that it reserves the right to conduct nuclear explosions for peaceful purposes."

Carvajal said that there are two principal treaties in the nuclear field prepared by the United Nations to contribute to disarmament. One of them is the nuclear nonproliferation treaty, which was drawn up with the purpose of preventing those countries that do not possess nuclear weapons from having them. Despite the discriminatory features of this document, more than 100 countries have signed and ratified it, demonstrating how well it has been received on all continents of the world.

Regarding the Tlatelolco Treaty, which proscribes the nonpeaceful use of nuclear energy in Latin America, Carvajal said that it is a multilateral instrument that has the merit of freeing a large area from the threat of atomic weapons in the southern hemisphere. "Our country has signed the treaty and it is ready to improve on it as long as other countries of the region also are willing to do so," the minister said.

CSO: 5100/2122

CHILE

BRITISH TO MODERNIZE NUCLEAR REACTOR, PROVIDE ARMY VEHICLES

Lima EL COMERCIO in Spanish 4 May 85 p B-2

[Text] London, 3 May 85—Great Britain is trying to sell military vehicles to the Chilean Government and seeking a contract to modernize a nuclear reactor, according to a report published today by the political information magazine NEW STATESMAN.

The magazine, which quotes Defense Ministry sources, reports that in January 1984, the government authorized the export of a Centaur model half-track vehicle in order that the Chilean armed forces could check its effectiveness.

Six Million Pounds

It seems that the Chilean Government is interested in acquiring 300 of those vehicles, which are equipped with a light machine gun as a standard item, though an ample assortment of accessories is also available.

A spokesman for the manufacturer of the Centaurs, Laird Ltd., declined to confirm the existence of this deal whose cost would be more than 6 million pounds sterling (some \$7.5 million).

British Government Authorization

On the other hand, also according to the NEW STATESMAN, the British engineering enterprise Fairey received permission from the government 6 months ago to submit to Chile a proposal for the modernization of a reactor of the Lo Aguirre nuclear power plant in the outskirts of Santiago. Though described as a civil nuclear power plant, the installation in question is fully under military control.

In September 1982, the British Government agreed to sell enriched uranium to Chile in return for the aid provided by the government of General Pinochet to the United Kingdom during the Malvinas war, according to the NEW STATESMAN.

Of late, the Chilean Government has become interested in the possible acquisition of a broad collection of British armament, ranging from

missiles (Rapier, Seawolf, Seacat, Swingfire and Blowpipe) to planes (Harrier and Hawk) and helicopters (Lynx), or various classes of ships.

Laborite Protest

The existence of these two British offers has provoked a protest from the Laborite opposition spokesman for Latin American Affairs, George Foulkes.

Foulkes asserted that the alternative is to support human rights or sell weapons, and it seems that the government of Margaret Thatcher has opted for the latter.

8414

CSO: 3348/687

CHILE

BRIEFS

FRENCH NUCLEAR TEST SCORED--The Chilean Government has firmly rejected the latest French nuclear test on Mururoa Atoll. This statement was made by Fernando Gamboa, the director of special policies of the Chilean Foreign Ministry. Gamboa added that Chile hopes the French Government will not remain indifferent to the unanimous desire advocating the suspension of nuclear tests in the Pacific. He pointed out that Chile supports the general condemnation of the test made by countries of the area and the protest of the South Pacific Permanent Commission (CPPS), which is made up of Colombia, Ecuador, Peru, and Chile. [Text] [Santiago Domestic Service in Spanish 2300 GMT 5 Jun 85]

CSO: 5100/2122

MEXICO

FAULTY MAINTENANCE OF LEAKING REACTOR ADMITTED

Mexico City LA JORNADA in Spanish 9 May 85 p 9

[Article by Emilio Lomas]

[Text] Salazar, 8 May--Ruben Bello, director of the National Institute for Nuclear Research (ININ), has admitted that the water leak in the Triga Mark III reactor has still not been found and that its repair may take as much as 6 months. However, he claimed that the leak has been reduced from 5 liters an hour to only .2 liter.

During a tour of the ININ facilities, Bello stated that the reactor is running under "abnormal operating conditions," but "not on an emergency basis."

He stressed that the Triga Mark is basically a research reactor, even prepared "to make mistakes," meaning that it has an "intrinsically safe" system.

He also admitted that the reactor had not had proper maintenance for over 15 years and added that the accident which occurred in the tank where the water is leaking is probably due to that fact. The liquid "is not contaminating and there is no danger." In addition, he stated that the National Nuclear Safety and Safeguards Commission is the agency that determined that the reactor should cease operating for safety reasons.

Bello maintained that it is still not possible to determine whether there was an act of sabotage and said that this will be determined after the Triga Mark is repaired. The greatest risk would occur, he continued, if the reactor should run out of water, but he explained that with a fifth of a liter per hour, the 150-cubic-meter tank would take over 25,000 hours to run dry.

He denied that foreign technicians had been called in to repair the reactor and added that the presence of experts from other countries at the nuclear center a few days ago "was so that they might offer a course on executive development." The problem is not that serious, he said, and consequently, it was not necessary to call in outside help.

He stated that the technicians of the Institute and the National Nuclear Safety and Safeguards Commission will be able to solve the problem in 6 months. He explained that plans have been made to install a camera in the tank and even look for the leak with the aid of a diver. However, he said that this will occur once the reactor core has been isolated in a parallel tank.

He also denied that there is any risk of radioactivity. The problem is technically manageable.

Concerning military vigilance at the center, he said that even before he had arrived, the soldiers were already guarding the zone. "If some of my closest aides are military men, it is because they graduated from the Military School of Engineering," he said.

For their part, Javier Villareal and Antonio Rojas, laid off workers who are standing guard at the gates of the center, maintained that the problems associated with the Triga reactor, by virtue of its low level of maintenance, do actually represent a potential danger that could be eliminated with adequate care. Nevertheless, ININ authorities discounted the statements of the workers.

Concerning technical personnel recently dismissed, those laid off claim that in terms of the average man years they represent, 52 percent correspond to professionals and skilled technicians, all with over 12 years seniority in nuclear research and some working for many years on projects under only recently considered to be strategic under the new nuclear law.

These laid off workers include ten research workers and technicians who, under the supervision of Javier Villarreal, were in charge of overhauling the reactor. Some of them have been called back to do the necessary inspections and proper repairs in order that the reactor might continue to operate.

It was also stated that David Bahena has proposed incorporating the remainder of the nuclear workers into section 178 of SUTERM [Sole Trade Union of Nuclear Industry Workers] and that indeed, this was a historic demand that the nuclear workers had made, but never under circumstances of a betrayal or at the cost of submission to management. Finally, they said that Bahena had already agreed upon the signing of an internal work agreement and a new readjustment of personnel that would totally break up ININ research projects.

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CSC 5100/2112

PERU

CONSTRUCTION OF HUARANGAL NUCLEAR PLANT DELAYED

PY101405 Lima EL COMERCIO in Spanish 2 Jun 85 p A 7

[Text] According to General Juan Barrera Delgado, retired, chairman of the Peruvian Institute for Nuclear Energy (IPEN), construction on the Huarangal nuclear center has been delayed for budgetary reasons. But he noted that it is expected that the construction work will be finished within 27 months. Before his departure for Argentina, where he will deal with issues pertaining to his high-ranking post, Barrera noted that the Huarangal nuclear center will be one of the most modern of its kind and that it will have technological and scientific support from the Argentine nuclear center, thus making the Huarangal center the main axis of national development.

The official noted that it seems that the authorities have not granted the proper attention to the Huarangal nuclear project and even less to the highly qualified personnel who are working at the plant. He said that the opposite is taking place in neighboring countries where the construction of nuclear centers and the training of the respective personnel is being promoted, thus placing us at a disadvantage.

Regarding the salary of IPEN technical personnel, Barrera said that this is an issue that must concern the proper authorities since the personnel in question are highly qualified professionals and technicians. He said that since there is a great demand for nuclear professionals abroad, Peruvian experts emigrate since they earn very low salaries here. These salaries are not in keeping with their capacity. He said that an IPEN professional's salary does not total \$150 while the same professional in Chile earns at least \$1,000.

Barrera Delgado left for Argentina where he was invited to attend the 35th anniversary ceremonies of the Argentine National Commission for Atomic Energy and the 36th anniversary ceremonies of the Bariloche Balteiro Nuclear Institute.

CSO: 5100/2124

PERU

BRIEFS

NUCLEAR PLANT CONSTRUCTION DELAYED—Budget considerations have delayed the construction of the Huarangal nuclear powerplant, but it is expected that the project will be completed within 27 months, according to a statement yesterday by Gen Juan Barreda Delgado (Ret.), president of the Peruvian Nuclear Energy Institute (IPEN). Prior to leaving for Argentina to confer on matters concerning his high office, Barreda said that the Huarangal nuclear powerplant will be one of the most advanced of its type and that, with technological and scientific assistance from its prototype in Argentina, it will become a pivotal point for national development. The official said that it appears as if the authorities had not given much importance to the Huarangal nuclear powerplant and much less to the highly qualified personnel who are working on the project. On the other hand, he said, neighboring nations are boosting the construction of such plants, as well as the training of personnel assigned to the respective plants, people whom they hold in great esteem. This situation, he added, has placed us at a disadvantage with other countries. Barreda said that the proper authorities should show concern over the salaries of IPEN personnel because these are highly trained and qualified professionals and technicians. He said that there is a great demand abroad for nuclear professionals and that Peruvian technicians are leaving the country because salaries are not commensurate with their qualifications. He revealed that the salary of an IPEN professional is not quite \$150, while professionals of the same level in Chile earn a minimum salary of \$1 thousand. Barredo Delgado's trip to Argentina is as a special guest to the celebration marking the 35th anniversary of the establishment of the Argentine Nuclear Energy Commission and the 36th anniversary of the founding of the Balseiro de Bariloche Nuclear Institute.

[Text] [Lima EL COMERCIO in Spanish 2 Jun 85 p A-7] 12674

CSO: 5100/2119

15 July 1985

INDIA

GANDHI DESCRIBES 15-YEAR PLAN FOR NUCLEAR POWER

Madras THE HINDU in English 30 Apr 85 p 9

[Excerpt]

From Our Special Correspondent

NEW DELHI, April 29.

The Prime Minister, Mr. Rajiv Gandhi, said today that a 15-year profile had been drawn up to raise the installed capacity in the country for nuclear power generation to 10,000 MW by the turn of the century.

Mr. Rajiv Gandhi told a meeting of the Parliamentary Consultative Committee for the Government's science departments that the uranium reserves in the country were enough to take care of this programme.

Work would commence in the next 10 years on 12 more units of 235 MW each and on 10 units of 500 MW each. Two of the 235 MW units would be located at Rawatbhata in Rajasthan (the country's second nuclear power plant was set up there) and another two at Kaiga in Karnataka.

The outlay on new plants was expected to be Rs. 2,000 crores during the Seventh Plan and Rs. 5,000 crores during the Eighth Plan. At the end of the Eighth Plan in 1995 the nuclear power generation capacity in operation was expected to go up to 4,400 MW.

The Prime Minister indicated a change in the earlier view that nuclear power stations located less than 800 km from a coal mine would not be cost-effective. Recent studies have shown that the cost of nuclear power would be competitive with electricity generated at coal-based stations even at distances short of 800 km, he said.

Accordingly the terms of reference of the site selection committee had been altered so as to include suitable locations in the eastern region of the country.

A plant had been set up at Tarapur where waste materials from the nuclear power plants were being stored without risks of any leakage to ensure safe management of such materials.

CSO: 5150/22

INDIA

ENVOY ON PAKISTAN'S NUCLEAR ENRICHMENT CAPABILITY

Bombay THE TIMES OF INDIA in English 27 Apr 85 p 15

[Text] New Delhi, April 26 (UNI)--Pakistani nuclear scientists have succeeded in enriching uranium up to five percent, the Pakistan ambassador, Mr M. Humayun Khan, said yesterday.

Addressing a luncheon meeting of the South Asia Foreign Correspondents Association here, the ambassador quoted President Zia as saying that "we have succeeded in enriching uranium up to five percent, but 90 percent enrichment is needed to build nuclear weapons."

An AP report on Mr Khan's address said the success made Pakistan the first third world country to acquire uranium-enrichment capability.

Asked if Pakistani scientists already have the capability to manufacture a nuclear bomb, the ambassador said: "I cannot say whether we have progressed to that extent, but as you may know, in the United States an undergraduate came up with a plan on how to build an atom bomb....so it's not so difficult to build a bomb."

Weapon-Grade Stuff

Mr Khan, however, said "Pakistan has no plan to make an atomic bomb."

According to the London-based international institute of strategic studies and Western intelligence report, Pakistan is trying to produce weapon-grade uranium at its enrichment facility which uses the gas centrifuge process.

Pakistan's centrifuge enrichment programme is headed by Dr Abdul Qadar Khan who has been accused of building the installation with the help of secret documents and blueprints acquired during a two-year stint at the Dutch centrifuge facility of united reprocessors (URENCO) at Almelo, the associated Press reported.

A British-German-Dutch consortium, URENCO was set up to find a cheaper way of enriching uranium for nuclear fuel.

CSO: 5150/0024

INDIA

EQUIPMENT PURCHASE FOR NEW NUCLEAR POWER UNITS

Bombay THE TIMES OF INDIA in English 29 Apr 85 p 15

[Text]

NEW DELHI, April 27: The nuclear power board has started advance procurement of some of the key equipment for the 235-MW units to be set up at Kaiga in Karnataka and Rawatbhata in Rajasthan.

These four units — two at each site — are part of the nuclear energy expansion programme which envisages 10,000-MW of generation capacity by the year 2000.

The present installed nuclear power capacity of 1,095 MW will reach 2,270 MW, with the commissioning of five units presently under construction at Kalpakkam, Narora and Kakrapar.

The 15-year plan prepared by the department of atomic energy envisages the construction of 12 standardised 235-MW reactors, the design work for which has advanced substantially.

The programme, according to the annual report of the department, represents an investment of Rs. 13,940 crores in all the related fuel cycle reactor projects (at 1983 prices). The total revenue that would be earned

by the year 2000 is estimated to be Rs. 40,500 crores and would include a 12 per cent return on capital.

Besides generating power, the pressurised heavy water reactors would produce plutonium for the launching of the country's fast reactor programme and the commissioning of the prototype fast-breeder reactor around the year 2000.

The Tarapur atomic power unit continued to be operated in a safe and reliable manner despite constraints on supply of spare parts from the U.S.

An engineering feat was achieved at the Rajasthan unit with the recommissioning of the Unit 1 which had developed a leak. The leak in a radioactive and inaccessible area was located and plugged with the help of indigenously developed special tools.

At Kalpakkam, the Madras atomic power project Unit 1 was declared commercial in January last year and the construction of the Unit 2 was nearing completion.

CSO: 5150/0025

INDIA

'ROUNDTABLE' ADVOCATES NUCLEAR BOMB FOR INDIA

Calcutta THE STATESMAN in English 13 May 85 p 13

[Text]

NEW DELHI, May 12.—At a day-long "round table" discussion on the nuclear threat and India's options, organized by the Servants of the People Society here yesterday, a broad view emerged that, with Pakistan close to having a nuclear weapon or already having it, it would be most unwise for India not to have it too.

The view was also voiced that India did not have to declare its intentions in this respect in advance; it should act first, and could then inform the people.

A former diplomat said that the consensus among the people had always been in favour of India going nuclear.

There were at least two—a CPI M.P. and an academician—who were against that entire proposition, but even they did not voice their opposition unequivocally.

Participants in the discussion included eminent former civil servants (like Mr P. N. Haksar and Mr Govind Narain), Defence and Foreign Affairs analysts (Mr K. Subrahmanyam, Mr Rajindra Saroen, Mr Bhabani Sen Gupta, and Dewan Berindranath), former diplomats (Mr Prakash Mehrotra and Mrs Rukamani Menon), journalists, (Mr Girilal Jain, Mr Nikhil Chakravarty, Mr K. R. Mahant and Mr C. G. Mirchandani), retired army officers (Major-General D. K. Palit, Maj-Gen Ram Singh, Lieutenant-General A. M. Vohra), academicians (Mr V. P. Dani) and members of Parliament (Mr H. M. Patel, Mr G. G. Swell, Mr Dinesh Singh and Mr Saifuddin Chowdhury).

Mr K. Subrahmanyam, Director of the Institute of Defence Studies and Analysis, who made a forceful plea for the bomb, said this country could not "duck" a decision any more in this matter and must go in for the bomb as a deterrent. "I don't see how we can safeguard our security if we don't go nuclear", he added.

COST

He argued also that by doing so, India could reduce its defence spending. A Mirage, he noted, cost vastly more than a nuclear missile.

He did not think that if India went in for the bomb, that would touch off an arms race. He suggested that it was absurd to talk of an arms race with a country which had only a fraction of India's GNP.

Mr Subrahmanyam also argued that the nuclear deterrent need not stand in the way of talks on improving relations. "We can have deterrence and we can still have talks", he said. The nuclear weapon, in his view, was essentially a political weapon.

DEBATE

He disagreed with the suggestion that a decision in this respect could be taken after a public debate. In no country had this happened, he said. Even in France, where there had been a debate, the decision had preceded the debate and was a secret one. The Government had the right of decision in this matter and it did not have to "articulate" that decision in advance to the public. There would, however, be a debate later, when the public could be

informed of the issues involved "so that public opinion is not in dissonance with the decision".

Mr H. M. Patel, who like most others endorsed that view, emphasized that for India to remain non-nuclear "once its potential enemy is likely to acquire the bomb or already has it" would be extremely unwise, and could have a disastrous effect on the morale of the armed forces. Also, by remaining non-nuclear, India would only be assisting Pakistan "to hold us to ransom".

He added: "whatever the cost we should be fully prepared to meet any kind of threat, including the nuclear threat, from the enemy".

Mr Krishan Kant, who initiated the discussion and set its tone, said: "The question to be seriously gone into is not merely what will it cost to go nuclear but how much it will cost the country if we did not go nuclear in the nuclear surroundings". The time, he added, had come to take a decision and formulate a policy.

The Lok Sabha Speaker, Mr Baisram Jajhar, who presided, wondered whether he could express an opinion on the subject, but added that it was a most crucial one relating to the preservation of this country's hardwon freedom. "A country has to rely on its own strength and devise its own ways and means for that purpose".

Major-General D. K. Palit wondered whether, in a situation where Pakistan had the bomb, India could remain without it.

Mr G. C. Swell was concerned about what would happen to the

morale of the Army if India did not equip itself with the bomb. He was also concerned about the consequence to India's image.

VIEWS

Some other views voiced in the discussion: a nuclear war was winnable, contrary to the view of some; few would listen to India, if it did not have the nuclear capability; it was necessary for us to have the best weapons, and these included the nuclear weapon; if only India had gone nuclear in the early 1950s, China and Pakistan would not have dared to attack us; also "we have no nuclear option, we have only a compulsion".

Mr Shabani Sen Gupta, who was among the dissenters, argued that India could never become a first rate nuclear power, it would not be allowed to become one, and it would have to stay content with being in the category of "small nuclear powers".

Exercising the nuclear option, he added, would not add to India's stature. In any case, the Government had made it clear more than once that India was not going nuclear.

AP adds: The Indian Ambassador to Pakistan, Mr K. D. Sharma, said in interviews published in newspapers today that "Pakistan has the capability of making two atom bombs a year".

"Pakistan has five nuclear institutions, out of which only one is under international inspection and safeguards". Mr Sharma was quoted as saying. "On the basis of the nuclear capability which Pakistan has acquired, it can produce two atom bombs each year", he told reporters in Karachi.

INDIA

EDITORIAL DOUBTS ATTAINMENT OF N-POWER TARGET

Calcutta THE STATESMAN in English 24 May 85 p 8

[Editorial]

[Text]

The annual report of the Department of Atomic Energy notes the "endorsement" of its nuclear power profile (1985-2000) with evident gratification. The target is 10,000 MW of nuclear power by the end of this century, which will entail the construction of 12 new power reactors of 235 MW each and 10 of 500 MW each. Considering the fate of earlier such projections, it is difficult to be certain whether actual progress in the next 15 years will be anywhere near this target. However, work may now proceed somewhat faster than before since the design of the 235 MW reactors is said to have been standardised. These will all be fuelled by natural uranium and moderated and cooled by heavy water. The arguments in favour of persisting with heavy water reactors are partly based on the experience already gained; there is also a more basic compulsion since India does not have any facility for producing enriched

uranium which is needed as fuel for light water reactors. But heavy water production so far has been far from satisfactory. Import of heavy water raises the question of safeguards, though probably not as stringent as in the case of any enriched uranium supply from abroad. Understandably, enriched uranium reactors are not under consideration for the immediate future. But considering that they are believed to be more efficient, the possibility of enrichment within the country needs to be explored to give the nuclear programme a wider option.

Immediate public interest however, will be focused on the sites for the new power stations planned. "Advance action" has already been approved for four 235 MW reactors, two each in Karnataka and Rajasthan. The Atomic Energy Department's site selection committee has made its recommendations regarding the southern, northern and west-

ern regions and a "priority-wise list of sites in these regions" is said to have been prepared for the installation of the 235 MW and 500 MW reactors envisaged in the 15-year profile. It would thus appear that not only has the committee not yet considered the eastern region but the region will have no nuclear power station even when the country's total capacity reaches 10,000 MW. This will only compound the neglect from which the eastern region has suffered in the installation of new capacity for conventional power. There is therefore considerable force in the proposal made by Congress (I) M.P.s from West Bengal for the early location of a nuclear power plant in the State or at least the selection of a site during the Seventh Plan period. The idea was mooted years ago but has never been seriously considered, though the argument that nuclear plants should not be set up in coal-bearing areas has long ceased to be relevant.

CSO: 5150/0028

15 July 1985

INDIA

BRIEFS

GANDHI ON NUCLEAR WEAPONS--Paris, 3 Jun (AFP)--India is deciding whether or not to develop a nuclear bomb in the belief that Pakistan may already possess more than one nuclear weapon, Indian Prime Minister Rajiv Gandhi told the newspaper LE MONDE in an interview published here today. "We think they (Pakistan) are very close to having one or that they already have one. In fact, more than one," Mr Gandhi told the Paris evening newspaper in an interview in New Delhi on 30 May. "As far as we are concerned, we have not yet taken a decision. But we are thinking about it," Mr. Gandhi, who arrives here on Thursday for a five-day visit, said. "You must understand that for India the possession of nuclear weapons by Pakistan is very disturbing. Islamabad has already attacked us three times. If they have the bomb that would change all the rules of the game." Mr Gandhi said that in principle India was against becoming a nuclear power, but had to think very hard about it. "We could have done it 10 or 11 years ago, but we did not. If we decided to become one it would take a few weeks or a few months," he said. On Sri Lanka, Mr. Gandhi, who is currently meeting Sri Lankan President Junius Jayewardene, repeated that India would not support a separate Tamil state to solve Tamil separatist violence. India had confiscated four million dollars worth of arms from Tamils in southern India who support the Sri Lankan Tamils, he said. [Text] [Paris AFP in English 1527 GMT 3 Jun 85 AU]

URANIUM FOR TARAPUR--Hyderabad, May 24 (UNI)--A consignment of about 10,000 kg of enriched uranium from France for the Tarapur atomic plant arrived by an Air-India aircraft here today. The fuel was brought in six special high-pressure cylinders covered with protective packing. According to an Air-India source, each cylinder contained 1600 kg of fuel. [Text] [Calcutta THE TELEGRAPH in English 25 May 85 p 5]

CSO: 5150/0029

PAKISTAN

COMMENTARY ON INDIAN 'TIRADE' ON NUCLEAR PROGRAM

BK180918 Karachi Domestic Service in English 1715 GMT 17 Jun 85

[Commentary by Saba Bukhari]

[Text]

Pakistan has urged India to respond to its proposals aimed at banishing nuclear weapons from South Asia. This was stated in a letter from the information minister of the Pakistan Embassy in Washington and published in *THE WASHINGTON POST*. The letter was necessitated to keep the record straight and remove the wrong impression being created by the Indian press, particularly in light of the statement of the Indian prime minister after his visit to Moscow. It may be added that on 8 June, the Indian press quoted Prime Minister Rajiv Gandhi as saying in an interview with a French weekly that India would be ready to sign the Nuclear Nonproliferation Treaty (NPT) if Pakistan did not possess nuclear weapons. The second day, the Indian prime minister, Rajiv Gandhi, categorically ruled out any possibility of signing the NPT.

The Indian tirade against Pakistan's peaceful nuclear program is nothing new as New Delhi, according to (?its) plan, never wants to miss an opportunity to tarnish the image of Pakistan in the outside world. The statements of the Indian prime minister, Mr Rajiv Gandhi, in Paris on Pakistan's nuclear program was recently (?agitated) in the national assembly of Pakistan through an adjournment sought to be moved by a member. While speaking on the motion, the minister of state for foreign affairs, Mr Zain Noorani, had amply clarified the impression created against Pakistan by the Indian lobby.

The minister had reiterated Pakistan's stand that Pakistan was pursuing a program of peaceful use of nuclear energy and did not intend to go nuclear. This assertion has been made time and again by Pakistani leaders including President General Mohammed Ziaul Haq, who on a number of occasions had stated that Pakistan does not want to go nuclear and its nuclear policy was peaceful. Pakistani leaders made specific request to Indian leadership to respond to Pakistan's offer. This was amply manifested in the demand made by Pakistan at various international forums to make the Indian Ocean and South Asia a zone of peace. Despite this, the Indian leadership, working on a systematic plan, tried to malign Pakistan. All rhetoric has been aimed at creating

hurdles for Pakistan in the European countries and also in America so that the good friendly relations developing between Islamabad and Washington are jeopardized.

As the letter from the Pakistan Embassy in Washington clearly states, Pakistan's initiatives reflect its desire to ease the tension, create mutual confidence, and strengthen cooperation in the region. The [words indistinct] from the Indian prime minister made in statement on 8 June to the French weekly, it was well taken in Pakistan, but this satisfaction was short-lived when Mr Rajiv Gandhi took a somersault and categorically ruled out the possibility of signing the NPT. It is really very strange that all sorts of motives are attached to Pakistan's nuclear program, but a safe picture is painted about India's nuclear program. Ever since he returned from Moscow, the Indian prime minister has been issuing statements which are meant to malign Pakistan. As to whom the Indian leadership is trying to misguide is a broad open question, but nobody can close their eyes to this fact.

Is it not a fact that the explosion of a nuclear device is a major step of a country going nuclear? India maintains that its nuclear program, the 1974 explosion notwithstanding, is peaceful and Pakistan's is not. In that case, India should have no problem in responding positively to various proposals made by Pakistan which will banish the spectre of nuclear arms from the South Asian subcontinent. This is an underlined fact that in 1974, when India made a nuclear explosion, Pakistan proposed to the United Nations the establishment of a nuclear weapons free zone in South Asia. This resolution has repeatedly been adopted by the UN General Assembly by an overwhelming majority. In 1984, it received 100 votes. If the Indian leadership wants to malign Pakistan, then they must not ignore the fact that in 1978 President Zia of Pakistan proposed to the prime minister of India that India and Pakistan accept international inspection of all their facilities and if it were not acceptable, then they reciprocally inspect one another's nuclear facilities. Pakistan's offer was never responded to because India wanted only to malign Pakistan with some motives which stand exposed today.

CSO: 5100/4765

PAKISTAN

GANDHI'S CRITICISM OF NUCLEAR PROGRAM VIEWED

GF171148 Lahore NAWA-E WAQT in Urdu 13 Jun 85 p 3

[Editorial: "The Interests of Issues and Safeguards"]

[Text] French President Mitterrand has said that France will honor all international accords and safeguards in its nuclear transactions with Pakistan and will exercise extreme caution in transferring any technology that might be used for military purposes. He said this to Indian correspondents accompanying Rajiv Gandhi in answer to a question on whether the French Government is ready to provide firm assurance that it will never assist Pakistan in the manufacture of a nuclear bomb.

Prime Minister Rajiv Gandhi has reached the final destination of his foreign sojourn, that is, the United States, but long before that he had embarked on a campaign to malign Pakistan. Besides Pakistan's nuclear program, another salient point in his campaign was opposition to the United States selling armaments to Pakistan in fixed annual installments. Obviously, this lamenting which he had started even before going on this tour will climax during his stay and talks in the United States.

Mr Rajiv Gandhi knows full well that Pakistan's nuclear program is limited and many years behind that of India. His real objective is to hinder the sale of arms to Pakistan being purchased from the United States for strengthening its defense. Like his mother, Mr Rajiv Gandhi also wants to halt the sale of U.S. arms to Pakistan so that Pakistan's ability to retaliate can be nipped in the bud, instead of growing.

The main reason for India's litany against the supply of F-16s is that previously India enjoyed the superiority of its Jaguar aircraft which could reach all parts of Pakistan, while Pakistan did not have the means or reliable equipment to retaliate. Although the F-16s cannot reach all parts of India, their range can be a useful deterrent to India if it considers this aspect before committing aggression. This is why India began whining even before an agreement was reached to supply F-16s to Pakistan, although India has the most sophisticated British, French, and Soviet aircraft and their number far exceeds that of Pakistan's F-16s. Hence, as India's clamor on this issue proved ineffective, Rajiv Gandhi has concentrated all his attention on Pakistan's nuclear program, taking into account that the United States, which is influenced by its Zionist lobby, and other Western countries continue their antagonistic obduracy. Thus, Mr Rajiv Gandhi has touched on a weak point of the Western countries in its

vendetta against Pakistan. Even though such anti-Pakistan propaganda appears childish, there is an element of "the fool is wise to his own interests" [urdu adage] in it. It appears that this anti-Pakistan campaign by Rajiv Gandhi is being given a warm welcome in the Western countries and will crest in his U.S. visit, but it is difficult to ascertain how successful he will be in his campaign. In the United States and the Western countries the fallacious idea, or it may be said an optimism, prevails that Mr Rajiv Gandhi is not as pro-Soviet as his mother was, and that if they wish, his pro-Soviet leanings could be lessened. What they do not comprehend is that it depends on the Soviet Union to a great extent as well, which has invested greatly in India's military, industrial, technical, and commerce fields.

This is really a tug of war between the United States and the Soviet Union who are trying to out do each other in wooing India. In addition, India is exhibiting extreme cunning and ingenuity in carrying on this opportunistic charade to reap benefits from both Moscow and Washington. As far as the assurances given by President Mitterrand while speaking to correspondents on Pakistan's nuclear program, it is something which is interpreted by the nuclear powers according to their own whims and fancies. They do not feel any shame in renegeing on an internationally accepted responsibility. The same assurances had been provided prior to France's agreement to supply a reprocessing plant for Pakistan's nuclear power plants. Pakistan had agreed to all the preconditions laid down by the IAEA but the United States, which is influenced by its Zionist lobby, applied pressure on France. This marked the end of its so-called liberal policy which was flaunted during the De Gaulle era. But when Israel seized a ship loaded with nuclear equipment in international waters, there was no frown on the United States' brow nor did France talk of international guarantees. With regard to India, it exploded a nuclear device as far back as 1974, which proved to the world that it is capable of manufacturing nuclear weapons. Now, the Indian prime minister is raising a hue and cry against Pakistan's limited program, and the Western countries are applauding him because this is strengthening their stance that the Islamic countries should not have access to nuclear technology via Pakistan.

It seems ridiculous to talk of the French president's utterances on keeping international guarantees in mind when France has been supplying enriched fuel to India for the past 2 years on U.S. instructions. Its objective is to increase the demand for its armaments in India and in this way it would not have to consult the Soviet Union but would approach the United States directly. It is for this reason that the French president announced that international guarantees would be borne in mind in any agreement with Pakistan. In other words, the question is one of interests and international guarantees are used as a pretext, but when these interests can be acquired by other means, then international guarantees are ignored. As far as cooperation and collaboration in the nuclear field is concerned, France has maintained two very contradictory and preposterous stances as regards India and Pakistan, that is, it talks of principles but only bears interests in mind.

PAKISTAN

MINISTER URGES INDIA TO SIGN TREATY

HK121214 Hong Kong AFP in English 1212 GMT 12 Jun 85

[Text] Islamabad, June 12 (AFP) — Pakistan today said it did not have the capability to develop nuclear weapons, and challenged New Delhi that if its intentions were peaceful, it should sign a bilateral treaty with Islamabad renouncing atomic arms.

Referring in Parliament to recent remarks by Indian Prime Minister Rajiv Gandhi on the Pakistani nuclear programme, Minister of State for Foreign Affairs Zain Noorani accused the Indian leader of forging "anti-Pakistan propaganda" and making "baseless statements" in order to pressurise the United States on the issue. Mr. Gandhi is currently in Washington — a strong supporter of Pakistan as a bulwark against Soviet influence in the region — where he is expected to voice concern at Pakistan's nuclear programme.

While Mr. Gandhi has warned India could swiftly develop nuclear weapons, Mr. Noorani said, Pakistan had a "peaceful" atomic programme that had no capability to develop bombs. Despite this, he said, "we are willing to join India and other nuclear weapons states in accepting international obligations not to produce nuclear weapons even in the future." He added that Mr. Gandhi's protestations about India's peaceful intentions "lack credibility" because "India is unwilling to back up its sanctimonious declarations by a solemn undertaking. We have taken appropriate steps to make our position known to the world, including New Delhi and Washington," Mr. Noorani told MPs. "Pakistan will not countenance any attempt to be singled out. But Pakistan is prepared, jointly with India, either to adhere to the nuclear non-proliferation treaty or to accept the full safeguards of the International Atomic Energy Agency."

It was also ready to support the creation of a South Asian zone free of nuclear weapons and enter into a bilateral treaty with India renouncing nuclear arms, he added.

CSO: 5100/4764

PAKISTAN

MINISTER CRITICIZES INDIA'S NUCLEAR STANCE

BK120656 Karachi Overseas Service in Urdu 0600 GMT 12 Jun 85

[Text] State Minister for Foreign Affairs Zain Noorani told the National Assembly this morning that India, instead of responding positively to the efforts initiated by Pakistan to establish better understanding and good-neighborly relations with that country, started a campaign to malign Pakistan and that Pakistan was frustrated with the way India acted. He was addressing the House in connection with approving an adjournment motion for debate.

He said that India has been carrying out massive propaganda campaign against Pakistan. Indian Prime Minister Rajiv Gandhi has been making baseless statements on Pakistan's peaceful nuclear energy program in order to force the United States to exert pressure on Pakistan. He stressed that we are fully confident of the sincerity of our stand, and Indian propaganda, which is based on blatant lies and double standards, is bound to be exposed. He said that absurd stories are being fabricated every other day, and that they will remain baseless, no matter how much propaganda is disseminated.

Zain Noorani said that, as the president has stated, we are making wholehearted efforts to establish peace with India, and we are very sincere in this regard. We desire normal, good-neighborly relations with India. The record, however, should be set straight. He said that our nuclear program is purely for peaceful purposes. Pakistan has no intention of producing nuclear weapons, nor is it working to acquire nuclear capability. He said the whole world knows that India carried out a nuclear test in 1974, and the Indian prime minister confirmed it. India can produce nuclear weapons within a few weeks or months, and there is no merit in the Indian prime minister's claim of India's peaceful intentions. Because, India is avoiding support of its emotional statements through international assurance. [sentence as heard] He said that, in contrast to India, Pakistan has openly expressed its readiness for an international agreement to ban nuclear weapons. Pakistan is opposed to discriminatory treatment and will not allow any such attempt against it to succeed.

Later, the House began deliberations on the finance bill to give legal shape to the Federal Government's tax and other economic proposals for next fiscal year.

PAKISTAN

WRITER SPECULATES ON STATE OF PAKISTAN NUCLEAR PROGRAM

Bombay THE TIMES OF INDIA in English 11 May 85 p 8

[Article by P.K.S. Namboodiri]

[Text]

CERTAIN recent assertions by Dr. A.Q. Khan, who has been described in the Pakistani media as the "father of the Pakistan bomb", together with the now known secret atomic "weapon tests" by Sweden add a few dimension to the assessment of Pakistan's nuclear capability.

On the basis of evidence at its disposal, the government of India has stated its position that the security plans of the country have to proceed on the assumption that Pakistan has either achieved a nuclear weapon capability or is in the process of acquiring it. Despite this there are lingering doubts about Pakistan's technological capability to go nuclear, and views have been expressed that the Pakistanis may be bluffing though there is little to sustain this view. In fact, the overwhelming evidence from various sources is to the contrary.

Available evidence points to the possibility that Pakistan has not only succeeded in enriching uranium to weapon-grade level, but also has probably designed and tested sub-systems of nuclear weapons, including physics-oriented studies with weapon-grade uranium just as Sweden has done. Indeed, it is possible that Pakistan may have actually conducted a nuclear test in a third country friendly to it.

In an unusually elaborate interview Dr. Khan granted to a Rawalpindi weekly, *Hurmat*, early in March this year, he disclosed that the Kahuta team under him had successfully built an industrial scale production plant "simultaneously" with the setting up of a laboratory scale plant to enrich uranium.

Maybe because of this complete success, he now claims that if required he can set up "a hundred plants like the one at Kahuta". This was obviously made possible because of the complete blueprint of a large plant he was able to obtain from the Urenco enrichment facility in the Netherlands where he had worked earlier and from where, according to the Dutch government, Dr. Khan smuggled out documents. Similar things happened when the Soviets gave the Chinese whole-scale technology and designs for a gaseous diffusion uranium plant which they set up in Lanchow.

Enrichment Rate

There is no way to determine precisely how big the larger Kahuta plant is. The Dutch government report on what it called the 'Han affair', had discovered that between 1976 and 1979, Pakistan had imported from Holland 6,500 tubes made of specially hardened steel, "recognisable as parts of a gas centrifuge system". According to a report prepared by the U.S. congress office of technology assessment, the Urenco-type enrichment facility would require only 400 centrifuges to produce weapon-grade uranium (around 90 per cent) from reactor-grade uranium (three per cent enrichment).

Pakistani leaders, including Gen. Zia-ul-Haq himself, have now admitted that the Kahuta plant has reached an enrichment rate of five per cent, thereby giving an impression that from there to 90 per cent is a long way off. This is not correct. In fact, it is the other way round. It is the initial enrichment from 0.7 per cent natu-

ral uranium to, say, five per cent that is the hardest part of the task. Thereafter the enrichment to the weapon-grade level becomes relatively easy.

The question therefore arises: Why has Pakistan chosen to announce a five per cent enrichment? For such an announcement is sensitive in view of the fact that three per cent enrichment is enough for power reactors. Is it that while being reluctant to admit weapon-grade enrichment, because of the political and diplomatic costs of such an admission, the military regime in Pakistan wishes to convey subtly, to its own people as well as world at large, its nuclear ambitions and achievements.

As for stocks of uranium ore needed for enrichment, the late Mr. Bhutto had admitted that he had bought quantities of uranium for the programme. Subsequent evidence suggested that he was referring to the 200 tonnes of uranium Pakistan bought from Niger under secret arrangements between the two governments and also Libya which then was very close to both. This itself is sufficient for a few dozen atomic devices and Pakistan can also bank on its own mines in Baluchistan.

Some Success

Having achieved the feat of weapon-grade uranium production, the Pakistani scientists would certainly have to tackle the subsequent stages of designing and testing explosive devices before they can build a nuclear arsenal. The clandestine operations of Pakistanis during the last two or three years to procure vital components like krytrons, reflectors, etc., some of which have been unearthed by U.S. and Canadian intelligence, give some indication of the current state of the Pakistani nuclear programme.

If reports quoting American intelligence are to be believed, Pakistan has already started off with some success. According to these widely quoted reports, China has supplied information on design of uranium warheads to Pakistan in return for China's access to the Urenco enrichment technology that the Pakistanis possess. Unconfirmable though they are, such reports also talk of the presence of Chinese scientists in the Kahuta

facility. It has been suggested moreover that the Pakistanis conducted a test explosion in China in the summer of 1983.

However, it is only fair to note that even if Pakistan has achieved nuclear capacity it may not be in a position openly to test its bomb for quite some years because of obvious constraints such as the threats of suspension of U.S. military and economic aid.

In any case, the need for such a test itself is not evident, if we go by past experience. The United States did not test its uranium device before the first uranium bomb was dropped on Hiroshima.

Israel and South Africa are reported to have been able to build a nuclear arsenal, based on uranium/plutonium without conducting test explosions. As far as scientific knowledge goes, it is even said that a test can be simulated in mathematical terms and the physical properties of nuclear detonations assessed with the help of computers. Now the reports about laboratory-scale nuclear explosions conducted by Sweden in 1972 underscore this point.

The Swedish tests with plutonium, currently the focus of a raging controversy in view of Sweden's legal and moral status in nuclear disarmament, appear to have been aimed at studying propagation of shockwaves through plutonium to get fundamental data of importance in the design of implosive triggers for plutonium weapons.

Different Stories

In this, possibly small samples of plutonium (one gramme according to some reports) may have been kept at the centre of converging shock waves generated by specially shaped conventional high explosives and the compression behaviour of the sample studied with appropriate measuring instruments. Since such a small mass will not go critical (because it is far below the 'minimum critical mass' for known densities), there would not have been any 'nuclear explosion' in a technical sense; but it would enable scientists to obtain vital, secret information for design of nuclear weapons. Such

laboratory-scale explosions are also possible with uranium as the fissile material. There would be no fission products and hence no radioactive danger, apart from the contamination arising from the shattered uranium or plutonium samples. Such tests cannot be detected by seismic methods.

It is unlikely that the Pakistani scientists have not explored such possibilities or experimented with them. Dr. Khan stated early last year in his *Nawa-i-Waqt* interview that he belonged to that school of thought which held that the reliability of a complete system can be taken for granted once the sub-systems have been tested and proved reliable, meaning that an open nuclear weapon test is not a pre-condition for assembling an arsenal. He reiterated this view recently when he said: "One can say, more or less with certainty, that in the light of present high technical knowledge there are some basic experiments by doing which a person becomes capable of carrying out an atomic explosion... without conducting any test."

There are other factors which cast doubts on Pakistan's protestations that its nuclear programme is peaceful. For instance, Gen. Zia has stated in several press interviews that the enrichment programme is not under the military but under the Pakistan Atomic Energy Commission (PAEC). Dr. A.Q. Khan has a different story to tell. He says Gen. Zia had assigned two senior military men (Gen. Akbar Khan and Gen. Anis) to lead the Kahuta team and that the project faced no bureaucratic and financial hurdles since Gen. Zia himself "patronised" it.

Secondly, he says he has no responsibility whatsoever in building nuclear reactors thereby disclaiming any association with the PAEC's power programme.

Dr. Khan has been highly critical of the PAEC and its chief, Dr. Munir Ahmed Khan. He ridicules the claim, albeit implicitly, that Kahuta uranium is meant for power reactors Pakistan is going to build in future. Since a new nuclear reactor takes a decade or more to build, he suggests that Pakistan should go in for more coal-based thermal power stations.

NIGERIA

TALKS RESUME WITH NIGER ON PROSPECTING

Lagos BUSINESS TIMES in English 27 May 85 p 1

[Article by Ngozi Ikeano]

[Text]

TALKS are going on between Nigeria and the Niger Republic on the possible reactivation of uranium exploration work at Afosta Est Madawola in the latter country. It has been learnt.

Nigeria holds a 16 per cent equity shares in the uranium project and work on the 2,400 square kilometres started in 1978.

As at 1981, the area had been partially explored and a reserve of 5,000 metric tonnes of uranium proved.

However, it was learnt that work on the project had since been suspended "because of the military installations within the area".

Nigeria also has mineral economic cooperation with

the Republic of Guinea. Nigeria has 25 per cent equity holding in a uranium exploration company. The first phase of the exploration campaign, it was learnt "was very encouraging".

It was gathered that uranium mineralization has been confirmed in three areas and in association with copper and cobalt.

The next step is to commence exploratory drilling in order to confirm the extent of the preliminary findings.

Nigeria's contribution in the project so far is US \$2.50 million (about \$1.92 million).

Nigeria also holds ten per cent equity shares in the Ayekoye Bauxite project in Guinea. Production in the project has been planned in two phases.

In the first phase, some three million tonnes of bauxite and 500,000 tonnes alumina would be produced.

It is envisaged that in the second phase, five million tonnes of bauxite and one million tonnes alumina would be produced.

However, none of the aforementioned projects is at the production stage yet, as they are still at different stages of exploration.

Exploration and exploitation of Nigeria's mineral resources have been stepped up in recent times, through the Nigeria Mining Corporation.

Solid mineral production for last year were: Cassiterite 1,781.41 metric tonnes, columbite 119.88 metric tonnes, kadiolite 286 metric tonnes, shale 126,680.00 metric tonnes, clay 82,230.17 metric tonnes.

Others include: limestone 2,774,820.00 metric tonnes, marble 651.00 metric tonnes, coal 76,076.85 metric tonnes, aggregates (granites) 1,706,084.93 metric tonnes.

SOUTH AFRICA

IMPACT OF U.S. NUCLEAR BAN MINIMIZED

Johannesburg THE STAR in English 10 Jun 85 p 13

[Article by Jaap Boekkooi: "A Nuclear Ban Will Have Little or No Effect"]

[Text]

An American ban on nuclear trade or co-operation, as recommended by the Senate Foreign Relations Committee, will have little or no effect on South Africa's nuclear programme.

South Africa has no current nuclear trade with America.

Sales of nuclear fuel under a bilateral nuclear agreement of 1957 were stopped by President Jimmy Carter when in power.

The American Government broke its own contractual obligation to supply enriched uranium for the American-built Safari 1 reactor at Pelindaba.

This has been ticking over at a quarter of capacity for a few years due to fuel shortages.

Safari 1 will, however, soon be back at a maxi-

mum 20 megawatt output when the Valindaba uranium enrichment plant, a stone's throw away, goes on stream in 1987.

Valindaba will produce 75 tons of 3.25 percent enriched uranium, of which 49 tons a year will

feed Koeberg nuclear power station near Cape Town.

As for Koeberg, the American vote will not affect this French-built power station since it is receiving enriched uranium on the world market until it is fuelled from Valindaba.

The vote may eventually have an effect on the position of Americans employed at Koeberg.

They could be recalled under nuclear co-operation strictures set by the American Code of Federal Regulations.

SOUTH AFRICA

RSA SAID ON THRESHOLD OF NUCLEAR INDEPENDENCE

Johannesburg THE SUNDAY STAR in English 19 May 85 p 7

[Article by Jaap Boekkooi]

[Text]

JET fighters, navy ships, enriched uranium, future submarines, nuclear fuel elements and nuclear power stations — these are the areas where giant strides are to be made by South African industry and technology in coming years.

During the past week the managing director of the Nuclear Development Corporation, Dr J P Hugo, said that the different technologies developed in mineral processing and at Pelindaba had brought nearer the time when South Africa would be able to manufacture its own nuclear reactors and nuclear power stations.

And the Atomic Energy Corporation executive president, Dr Wynand De Villiers, added another optimistic note: In a few years, when the Valindaba uranium enrichment plant comes into full operation it will produce a surplus of this fuel which could be exported.

One gap in South Africa's nuclear technology is that although it makes enriched uranium fuel to run nuclear power stations, this fuel still has to be sent abroad to be converted to complex nuclear fuel elements which are fitted into reactors.

But both Dr De Villiers and Dr Hugo said the Atomic Energy Board was now looking at the manufacture of fuel elements and there was "no doubt whatsoever we have the ability to manufacture them".

Dr De Villiers also forecast that South African-made enriched uranium would closely match international prices once the present world glut in this fuel ended — something which was expected by 1992.

Dr Hugo forecast that nuclear power would become economical in the Western Cape. Such power had become less expensive than power-from-coal in many countries.

Safari 1

SOUTH Africa's first nuclear reactor, Safari 1, has in its 20 years of existence become one of the country's top lifesavers and technological helping hands.

American-made and installed, the reactor, which almost came to a standstill because of American President Jimmy Carter's nuclear fuel boycott against South Africa, has helped medical scientists to "see" the previously invisible, like the inside of human bodies and its continuous physical functions.

In this way it played a major role in preventing the death of many sick people, especially cancer patients whose tumours could be identified early through rays given off by treatment with isotopes manufactured at Safari 1.

At the same time the reactor also saved many industrial "patients", by again seeing the invisible, such as hidden leaks in pipes, weak spots in steel, wrong mixes in chemical tanks and many other applications.

Many of the survivors who drive past futuristic Pelindaba, with its massive concrete structures on the bushy slope of the Witwatersberg and its

weird-looking ventilation towers, never realise their cure was originally dreamed up in the laboratories of the Nuclear Development Corporation there.

Among other achievements there are isotopes that work only for seconds or minutes, long-life cobalt isotopes that sterilise medical equipment, and even a "spot manufacturing machine" that can be used in a hospital to make the short-life Technetium 99 isotope (with a half-life of six hours) which will soon have been used on 50 000 patients.

By circulating short-life liquid or powder isotopes through human bodies, at less radiation than a single X-ray photograph, doctors can watch, and interfere with, anybody's "internal affairs" just by watching the gamma rays emitted from the corpus. So they can see any malfunction in a liver, kidneys, lung, intestine and other organs.

The executive chairman of the Atomic Energy Corporation, Dr Wynand de Villiers, has announced that Safari 1 will soon be upgraded to work at 20 megawatts, four times its present capacity, when it is fed South African-made 45 percent enriched uranium fuel.

SOUTH AFRICA

SECOND NUCLEAR PLANT 'UNLIKELY WITHIN TEN YEARS'

Johannesburg THE CITIZEN in English 27 May 85 p 11

[Article by Janine Stein]

[Text] A SECOND fully operational nuclear power plant in South Africa within the next 10 years is unlikely despite a growing call to recognise the importance of nuclear power in the future electricity requirements of this country.

Reacting to a Sunday newspaper report which strongly suggested a second nuclear power plant by 1995, an Escom spokesman said a new power plant was unlikely to be in operation before the turn of the century.

However, the possibility of a second plant could not be ruled out as the present state of coal consumption made the increase in the number of nuclear power stations in this country by the next century almost inevitable, the spokesman said.

Meanwhile, the Escom report into the safety of stainless steel pipe fittings at the Koeberg atomic power plant near Cape

Town should be completed shortly and re-opened after a five-month shut down.

The Atomic Energy Corporation has yet to receive the report before they give the go-ahead for the plant to resume operation after it was closed down because of faulty piping in January this year, an Escom spokesman said yesterday.

Escom is still in the process of gathering information from manufacturers of the stainless steel piping in various parts of Europe and this investigation was "progressing well", the spokesman said.

"About two weeks after the AEC has studied our report and are satisfied, we should have the plant operating at full capacity," he said.

A spokesman for the AEC yesterday said the moment Escom satisfied the safety requirements of the corporation, they

would be granted a licence to re-open the Koeberg plant.

He said the Escom report would be handed to the Council for Nuclear Safety who would then decide whether or not their requirements had been met.

The spokesman stressed that the AEC was a safety device to protect the public and had shut down the Koeberg plant in January, not because of any immediate danger which was presented by the inclusion of "soft steel" into the stainless steel pipings, but because of the danger this might present in seven to 10 years time.

SOUTH AFRICA

SAFARI-1 PROVES TO BE RICH INVESTMENT

Johannesburg ENGINEERING WEEK in English 23 May 85 pp 4-5

[Text]

SAFARI-1, the first nuclear reactor of any significance in Africa, commemorates 20 years of existence this year.

Situated at Pelindaba near Brits, in the picturesque foothills of the Magaliesberg, SAFARI-1 was purchased in terms of a bilateral agreement between South Africa and the USA on the civil uses of nuclear energy signed in Washington in July 1957.

The purchase included highly enriched fuel (roughly 90% enriched), which was to be delivered at intervals as required, initially on a lease basis, and subsequently as an outright purchase.

In terms of the agreement, South Africa would receive credits for the residual unused uranium recovered during reprocessing in the USA.

The then Atomic Energy Board (now the Nuclear Development Corp of South Africa), under whose direction nuclear research was initiated, originally intended to purchase a research reactor with a capacity of 5 MW.

The intention was to use the reactor to provide training and experience for a second phase, which was to have involved the design and construction of a more advanced type of reactor with an average flux of at least 10^{14} neutrons/m²/sec.

That intention, however, had been based on information available three years before, and, in those three years, other possibilities had appeared.

High-flux

It became possible to combine these two phases by installing a high-flux materials testing reactor designed for high-power operation which could also be operated at much lower power until higher power was required.

The decision was, accordingly, taken to purchase an Oak Ridge-type reactor (ORR), a 6.66 MW unit which could be operated comfortably at 20 MW, and even at up to 30 MW if required.

Almost exactly a year after the letter of intent was signed committing the AEB

to the construction of the reactor, later dubbed SAFARI-1 (South African Fundamental Atomic Research Installation), planning and design activities were initiated at a small, informal ceremony.

In 1960, a main contractor was appointed to construct the reactor building and associated facilities and services, and US-based Allis Chalmers was appointed sub-contractor for the design and fabrication of the sophisticated nuclear equipment and the fuel elements.

By that time, the site had been chosen and, in 1961, excavations for the first buildings started.

Aluminium

A small group of scientists and engineers was sent to the USA for training, and to work with the US company to ensure that the design and fabrication was to spec, and to ensure that the contract provisions were met.

A second group of scientists and engineers had,

meanwhile, been conducting nuclear research at centres in the USA to execute the AEB's nuclear research programme.

The completion of the SAFARI-1 project was scheduled for the end of 1963. It was, however, substantially delayed by a rare accident at the contractor's workshop in the USA.

A sling cable, in the process of hoisting the reactor vessel — a 4.5 m-tall, 1.5 m-diameter heavy aluminium cylinder — and its 100 mm-thick stainless steel lid, snapped, sending its load crashing sideways on to the floor (the sling capacity was rated for the vessel alone).

The ensuing repair work delayed the project for a year but, towards the middle of March 1965, the first fuel elements were loaded.

At 6.30pm on 18 March, after intensive "cold" tests, the reactor went critical for the first time.

The power was then slowly increased to 6.66 MW.

In terms of the warranty, the reactor had to be operated at that level for seven days, and it was during this trial period that the only potentially serious incident in SAFARI-1's 20-year operating life occurred.

A small plutonium-beryllium startup source, used to initiate the fission reaction, overheated and cracked, releasing plutonium into the primary cooling water. (Although at no time did the incident pose a threat to either staff or the public, the resulting contamination plagued the reactor operating personnel for a number of years.)

The incident meant that the reactor had to be cleaned, and this, again, caused some delay. Finally, on 4 May, the warranty operating period was

successfully completed and SAFARI-1 was handed over to the AEB.

On 5 August, the reactor and reactor building were officially opened.

From then on, SAFARI-1 was operated intermittently for important physical tests, fuelled with elements supplied by the USA in accordance with the original agreement.

Testing

On 6 February, 1969, the power of SAFARI-1 was successfully raised to 20 MW.

Subsequently, it was operated on a day-shift basis at 10 MW from Mondays to Thursdays, and at 20 MW on Fridays. This was done to thermally cycle the reactor vessel as much as possible, and to observe the behaviour of the reactor.

A significant achievement in nuclear technology has been the research and development of medium-enriched fuel elements for SAFARI-1, following the refusal of the Carter administration to observe the conditions of the 1957 bilateral agreement.

Soon after Carter's inauguration in 1977, the US administration placed an embargo on fuel to South Africa, subject to certain conditions.

South Africa was not prepared to submit to those conditions, so, with a Hobson's choice, and having both the knowledge and the technology, research was undertaken to locally develop medium-enriched fuel for SAFARI-1.

In April 1981, the first locally manufactured element was placed in the reactor core, and South Africa became independent of overseas supplies of fuel.

Increasingly, SAFARI-1 is being put to use in the field of applied materials testing, for which it was originally designed.

Sophisticated facilities are being set up for testing power reactor core materials under very demanding irradiation conditions.

A high neutron flux is present in a power reactor core, and all materials in the core are slowly damaged by neutron irradiation.

Power reactor core conditions will be simulated in SAFARI-1 to enable Nucor to test locally produced core materials prior to their use in power reactors in the future.

Since March 1965, the uses of the SAFARI-1 reactor have branched off into many fields, notably the applications of radioactive isotopes and radiation.

Following the success of earlier research work, the new Isotope Production Centre, a branch of the chemistry department, opened on Thursday, 12 March, 1981 to produce radionuclides for nuclear medicine, agriculture, research and industry.

The technological applications of radioactive isotopes in South African industry have increased noticeably since the first man-made radionuclide arrived in the country in 1948.

This technology is based on the use of nuclear radiation — alpha, beta, gamma or X-rays radiating from a source — to determine the behaviour or characteristics of a medium.

The rays act on the medium and cause the original radiation to be changed or new radiation to be released. The changes are then measured and related

to the specific variable to be determined.

This behaviour of radiation means that the thickness of materials can be determined with the aid of instruments containing radioactive sources, and that densities and even compositions of materials can be determined.

Examples of the use of these methods are:

- Diagnosis of the internal condition of reactors and distillation columns in industry;
- Level measurement and density measurement;
- Mass flow measurement;
- Mass measurement on conveyor belts;
- Determination of the ash content of coal;
- Thickness measurement of paper, metal cladding and sheet metal;
- Industrial radiography;
- Concentrations of solids in slimes;
- Sediment determination in water; and
- Detection of steel reinforcement in concrete.

Process

The way in which neutrons act on matter makes it possible to obtain information that cannot be obtained by other types of radiation.

Such information includes moisture measurement, determination of boron in materials, determination of light materials in thick metal containers, and neutron radiography.

The neutron activation analysis technique is used to identify some elements in materials.

Because neutrons have no electrical charge, they easily penetrate the nucleus of other atoms and cause a nuclear reaction.

In this way, in some cases, a nucleus becomes

radioactive and emits radiation which can be detected with instruments. Use is usually made of a nuclear reactor such as SAFARI-1 in which a high neutron flux is present, but certain element analyses can also be done by using neutrons originating from relatively inexpensive radioactive isotopes.

Some of the elements that can be determined more easily with neutron activation are fluorine, aluminium, silicon, manganese, chrome, iron, copper, silver, tungsten and vanadium.

When ionising radiation (alpha, beta, gamma and X-rays) acts on the electrons of the atoms of elements, X-rays are released whose energy is characteristic of each specific element.

Identification and the determination of the concentration of most elements in materials are, therefore, easily achieved by analysing the corresponding X-ray spectra.

Another technique greatly in demand in the past 10 years is the use of radioisotopes as tracers.

The Nuclear Techniques Industrial Service of Nucor (NTIS) uses this technique, in particular, to solve certain industrial problems.

Tracers

In some cases, the naturally active elements in materials are used as tracers, for example, uranium, thorium, potassium and tritium. However, the use of natural radioactivity is limited because of the low concentrations occurring in nature.

Radiotracers are, therefore, manufactured for various purposes in SAFARI-1 by material being irradiated with neutrons and made radioactive.

Examples of investigations with radioactive tracers are material-movement studies, flow measurements, measurement of corrosion and wear, mixing efficiency studies, detection of leaks and blockages, sediment-movement studies and pollutant-dispersion studies.

The greatest demand for radioactive tracer studies in industry is in material

movement and includes the measurement of dead volumes, determination of residence times of material in certain systems, flow measurements, diffusion-rate determinations and the determination of the degree of mixing.

Gas leaks can also be detected in many cases. Radioactive gases are used for this purpose. Many studies on the determination of sediment movement on the ocean floor have been done with tracer techniques.

Radioactive tracer techniques have, up to now, also made a meaningful contribution in pollution control studies and, in this way, have been used to the benefit of man.

Nuclear techniques are clearly not magical tricks. In many cases, these techniques cannot be used and conventional ones are the better choice.

However, there are many cases in which nuclear techniques are, undoubtedly beneficial, some even where they are the only means by which a problem can be solved.

SOUTH AFRICA

NUCLEAR FUEL PRODUCTION POTENTIAL DISCUSSED

Johannesburg BUSINESS DAY in English 3 May 85 p 7

[Article by Dr Wynand de Villiers: "The Age of Atoms Dawns on South Africa"]

[Text]

SOUTH AFRICA needs an ample supply of electricity to improve the quality of life of its fast-growing population and expanding industry.

Nuclear energy will have to play a vital role in satisfying that increasing demand. That role will always be complementary to coal but will continue to increase with time.

If electricity demand continues to rise at 5% per annum, and no new resources of coal become available, the present known resources will allow the last coal-fired power station to be commissioned in about 40 years' time.

Thus nuclear energy will have to play a fast increasing role early in the next century. Koeberg — SA's only nuclear-powered generating plant — is in fact merely the beginning of a nuclear-based electricity supply system in South Africa.

SA has only two natural energy resources at its disposal: coal and uranium. While coal-fired power stations pose an ever-increasing pollution problem unless expensive anti-pollution measures are installed, our coal resources provide an extremely important resource of raw materials for the chemical industry and for the production of liquid fuels.

Admittedly uranium, when used as a fuel in a nuclear power station of the Koeberg type, is not an unlimited resource. However, if used in advanced reactors such as the fast-breeder reactor, of which several prototypes are already in operation in the more advanced countries, our

present resources could be sufficiently extended to last for many decades.

A comparison of the relative costs of nuclear and coal-fired electricity shows that the cost of a unit of electricity from Koeberg is undoubtedly higher than that generated by a new pithead coal-fired plant in the Eastern Transvaal. However, over the life of two such power stations, the potential increase in fuel costs of the coal-fired station, the cost of anti-pollution measures and the availability of water and its cost in the future, leads to an eventual advantage in favour of nuclear power.

Whereas the cost of transportation of coal — even over short distances — causes a significant increase in fuel cost for a coal-fired plant, the small quantity of nuclear fuel which has to be transported means that if nuclear power is independent of fuel transportation costs, this advantage encourages the siting of nuclear power stations at the coast, using sea-water for cooling and thus conserving inland fresh water resources.

Until economics allows the widespread use of nuclear energy in the generation of electricity in South Africa, both these resources, coal as well as nuclear, should be utilised in a complementary way instead of exporting nearly all our uranium production and burning our coal reserves in power stations.

As for self-sufficiency in supplies of nuclear fuel ... production of enriched uranium is progressing according to schedule and the facility should be producing enough enriched

uranium for Koeberg's needs in approximately two years.

The next step in the fuel cycle is the local manufacture of fuel assemblies, but I am convinced that having achieved the enrichment of uranium, the Atomic Energy Corporation (AEC) will also be able to manufacture the nuclear fuel for Koeberg.

It is, however an expensive process and until such time as a large enough demand for nuclear fuel exists, and the advantage of economy of scale can be realized, locally-manufactured fuel will be more expensive than imported fuel.

As for public fear over nuclear waste, compared with other industries, the nuclear industry is "clean". The technology of nuclear waste disposal is well-advanced and because of the relatively small quantities involved, the handling and isolation of low and medium level wastes present virtually no problems. If dealt with responsibly, the impact on man and his environment will be negligible.

South Africa has selected Vaalputs in Bushmanland as its nuclear waste disposal site. This site is situated in an arid region with little economic viability and an extremely low population density. It could serve our nuclear industry for many years.

The Vaalputs site has been selected with the ultimate storage of high-level wastes in mind. High-level waste becomes a factor only once used fuel elements are reprocessed. Although a decision on reprocessing has not yet been taken, used fuel elements can be stored safely, either in pools at the nuclear power station or above or below ground level at the Vaalputs site.

It must be kept in mind that the hazard attributed to nuclear wastes arises from its radioactive radiation properties. Unlike other poisonous substances associated with certain other industries, the radiation intensity of radioactive waste decreases with time. It is internationally recognized that rising levels of substances such as lead and mercury present a growing threat to man. These substances do not decrease with time, and remain a hazard.

Again, because of the relatively small quantities involved, nuclear waste can be completely isolated from the environment for as long as necessary.

SOUTH AFRICA

BRIEFS

KOEBERG GENERATES LOSSES--Escom's annual report, tabled in Parliament this week, outlines the heavy cost overruns and losses connected with the Koeberg nuclear power station. Secrecy laws prevent disclosure of all the reasons behind these losses but the report offers an outline of what went wrong. An important reason was the refusal of the United States to release enriched uranium to South Africa, forcing the Energy Department to find alternative supplies on the open market. This, combined with project delays, caused by the 1982 Koeberg sabotage, led to excess stocks of converted uranium feed and enriched uranium in the US, and of natural uranium ore concentrate in South Africa. Because of a sharp reduction in market prices, it became necessary in 1983 to write down by R56,8m. Delays in commissioning Koeberg, mainly because of the sabotage, resulted in interest and other costs totalling R68m being written off in the income statement for 1984. The report points out that of Koeberg's R519m cost overrun from 1975 to 1984, R463m was due to inflation and higher interest charges which were capitalised. [Text] [Johannesburg BUSINESS DAY in English 23 May 85 p 3]

NUCLEAR CONTROL CENTRALIZATION--The two main affiliates of the Atomic Energy Corporation, the Uranium Enrichment Corporation and the Nuclear Development Corporation, are to be done away with in a move to centralise control of the AEC. [Text] [Johannesburg BUSINESS DAY in English 24 May 85 p 1]

KOEBERG NUCLEAR UNIT NO 1 RESUMES OPERATION--Unit One at the Koeberg nuclear station started delivering power to the national grid today after being out of commission since January this year to allow inspection of stainless steel piping. Mr G.F. Hellstrom, regional manager of ESCOM, said the unit would deliver full power by the middle of next week. The unit was shut down after ferritic inclusions (tiny iron particles) were found in some of the stainless steel piping of Unit Two. Since then, an extensive programme of inspections had taken place, including visits to manufacturers overseas. Mr Hellstrom said the Atomic Energy Corporation Licensing Branch and the Council for Nuclear Safety had reviewed the evidence submitted by ESCOM and had given permission to restart Unit One. Commissioning activities on Unit Two had been resumed, and it was expected the unit would deliver its first power in August. An extensive testing programme will then begin with power being increased gradually leading to full delivery in October. [Text] [Johannesburg Domestic Service in English 1600 GMT 17 Jun 85 MB]

15 July 1985

KOEBERG 2--South Africa's next nuclear power station may be built right next to the present one at Koeberg, according to the head of the Atomic Energy Board, Dr Wynand de Villiers. Speaking at a conference at Pelindaba Dr de Villiers said he was expressing a personal opinion on the site. "At Koeberg we have space for six nuclear power stations," he added. Dr de Villiers also said that by early next century South Africa might have between 25 and 50 nuclear power stations. This was because coal reserves were not infinite and demand for electric power was set to double every 14 years to some 100 000 megawatts in less than three decades. By that time almost half of all the power generated in South Africa might be nuclear-based. To feed these stations the uranium enrichment plant at Valinbada, now of demonstration plant size, could be enlarged. At present Valinbada produced 75 tons of enriched uranium a year of which Koeberg would take 48 tons. "If we get a buyer we'll sell the rest," Dr de Villiers said. Escom had bought enriched uranium stocks on the international market at a 30 percent discount because of a world glut. "But we expect world demand to outstrip supply in another seven years." [Text] [Johannesburg THE STAR in English 24 May 85 p 6]

CSO: 5100/30

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15 July 1985

CEMA BLOC COOPERATES IN UTILIZING SOVIET VVER-440 REACTORS

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 2, Feb 85 pp 16-19

[Article by Eduard Akopyan, Yuriy Malkov and Yevgeniy Katunov, Soyuzglavzagranatomenergo All-Union Association, the USSR Ministry of Power and Electrification: "Erection and Operation of AES with VVER-440 Reactors"]

[Text] At the present time, atomic energy in CEMA member-countries has become a large independent sector. A big scientific and technical potential has been created, serving as a reliable base for the broad development of atomic energy in the immediate decade ahead and in the more remote perspective.

Following the startup of the first atomic electric power station in 1954 in the USSR and other European countries--CEMA member-countries on the basis of intergovernment agreements carried out the construction of powerful AES, which made it possible for atomic energy to occupy a prominent place in the fuel and power economy of these countries.

Effect of Specialization and Cooperation

A determinative role in the development of atomic energy is played by fraternal cooperation among CEMA member-countries based on the use of the Soviet Union's experience, constant expansion of specialization, cooperation and mutual deliveries of equipment and carrying out of a large volume of joint scientific and technical investigations. The Agreement on Multilateral International Specialization And Cooperation of Production and Mutual Deliveries of Equipment for Atomic Electric Power Stations for the Period 1981-1990, the largest of its kind in the history of the CEMA, is being successfully fulfilled. All in all, the agreement includes more than 140 designations of equipment of which about 50 percent are made and supplied by the USSR.

During 1981-1985, the average annual volume of reciprocal deliveries of equipment for the AES being built in CEMA member-countries grew about five-fold compared to 1976-1980 and for 1986-1990 the growth should be tenfold. Approximately 50 industrial enterprises and associations of eight fraternal countries are taking part in implementation of the agreement.

Manufacture of the equipment for AES according to unified technical documentation and its acceptance in accordance with the requirement of the general designer and planner whose functions are performed by the Soviet side have ensured and are ensuring the necessary conditions for efficient and reliable operation of the AES.

In conformity with the agreement, each side specializes in the production of certain kinds of equipment. Czechoslovakia in particular produces and supplies reactors, steam turbines, steam generators and large-diameter pipelines; Bulgaria--bioprotection equipment, condensers, axial and artesian pumps; Hungary--materials handling machines and special water purification equipment; the GDR--overhead cranes, transport and technological equipment; Poland--volume compensators, heat-exchange equipment, reserve diesel generator stations and intra-reactor-control systems; Romania--hydraulic tanks for emergency cooling systems and GTsN [hydraulic centrifugal pumps]; Yugoslavia--overhead cranes, feed and special pumps, repeated forced-circulation loops and separator drums for large-capacity channel reactors.

Whereas in the erection of the first power units with VVER 440's in the GDR and Bulgaria, the Soviet Union carried out practically the entire volume of the planning work and supplied all the basic and auxiliary equipment, today the situation has significantly changed.

In the lapsed time, collectives of planning, construction and installation organizations were formed in the countries. Thanks to the experiment acquired in the erection of the first power units of the AES and fruitful cooperation with corresponding organizations of the USSR, they are capable at the present time of performing independently a significant amount of work relating to the erection of AES. Furthermore, with each year the share of this work has been increasing, which is a direct result of fraternal cooperation.

The experience of the USSR and other CEMA member-countries in the erection of AES is being used in all the countries. Thus the method of construction from steel cells, which reduces outlays of worktime at the construction site and increases labor productivity, has come to be widely used. A method of flow construction of AES power units was introduced at one site. It made it possible to significantly reduce the startup time of the power units and to more fully employ construction equipment and manpower and material resources.

At the outset of 1984, established AES capacity in CEMA member-countries was in excess of 29,000 megawatts, including in the GDR--1,830 megawatts (Bruno Loeschner AES and Rheinsberg AES), Bulgaria--1,760 megawatts (Kozloduy AES), Czechoslovakia--1,320 megawatts (V-1 Bogunice AES), Hungary (Pacs AES) and the USSR--in excess of 23,000 megawatts (not including experimental and small AES) at 14 AES.

In 1982-1983, the annual output of electric power at the AES of CEMA member-countries exceeded 130-140 billion kilowatt-hours. In this connection, the AES share in production of electric power comprised 26 percent in Bulgaria, about 22 percent in the GDR, about 20 percent in Hungary, about 8 percent in Czechoslovakia and more than 7 percent in the USSR.

Of the total number of operative AES, the share of AES power units with VVER-440 reactors used as the basis in the first stage of development of atomic power in CEMA member-countries is at the present time in excess of 35 percent (in terms of capacity). The first power units of this type were put into operation in 1972 in the USSR (at the Novovoronezhskaya AES) and in 1974 in the GDR (at the Bruno Loeschner AES) and in Bulgaria (at Kozloduy AES). By the end of 1984, a total of 213 such power units (Table 1) were in operation in CEMA member-countries and 2 power units in Finland.

Experience of Operation

More than 10 years of experience of operating AES with VVER-440 reactors in the USSR, Bulgaria, the GDR, Czechoslovakia and Hungary show that power units of this type provide a reliable supply of electric power and also of heat in some countries.

AES have high technical-economic indicators. Thus cost of electric power produced at AES, despite the higher capital outlays on their construction, is lower than at thermal electric power stations using organic fuel.

During 1972-1983, the annual coefficient of use of installed capacity (KIUM) of a (440-megawatt) power unit, averaged for all operating AES power units with VVER-440 reactors in the USSR, Bulgaria, the GDR and Czechoslovakia was 72 percent and for individual power units--80-85 percent. Comparison of the annual coefficient of use of installed capacity for the AES of CEMA member-countries and other states graphically shows that power units with a VVER-440 reactor operate more efficiently (Table 2).

The average operational time of power units under load in the course of a year amounts to 7,200-7,400 hours. This includes annual stoppages of each power unit for planned replacement of one-third of the nuclear fuel in the reactor and inspection of the equipment in this period. For some power units, the length of operation in the course of a year reaches 7,500-7,800 hours.

Underutilization of installed capacity because of unplanned stoppages of power units due to breakdowns and defects of equipment amounts to 2-5 percent a year and expenditure of electric power for own needs of the AES--6-7 percent.

Good technical-economic indicators are due to reliable operation of equipment. The many years of practice of operation of AES power units with VVER-440 reactors show that the predominant portion (80-85 percent) of difficulties occurs in the conventional equipment of an electric power station (turbine, electrical, auxiliary and accessory).

For its maintenance in the required condition, power units are examined annually and necessary repairs are carried out during the period of reloading nuclear fuel. At the same time, special attention was paid to monitoring of the metal of the basic equipment of the AES (the reactor, steam generators, pumps and pipes, the turbine installation and the generator). Disclosed defects in the metal turned out to be insignificant and were easily corrected, and no hindrances to continuing operation of the basic equipment were observed.

Table 1. AES with VVER-440 Reactors in CEMA Member-Countries

Country	AES	Energy-unit number	Capacity, megawatts
USSR	Novovoronezhskaya	3, 4	2 x 440
	Kolskaya	1, 2, 3, 4	4 x 440
	Armskaya	1, 2	2 x 408
	Rovenskaya	1, 2	2 x 440
Bulgaria	Kozloduy	1, 2, 3, 4	4 x 440
GDR	Bruno Loeschner	1, 2, 3, 4	4 x 440
Hungary	Pacs	1, 2	2 x 440
Czecho-slovakia	Bogunice	1, 2, 3	3 x 440
Total		23	10,056

Table 2. Coefficient of Use of Installed Capacity of AES with VVER Reactors

	1978	1979	1980	1981
In all countries of the world (except CEMA member-countries)	69.0	58.0	59.0	64.0
In West Europe	79.0	69.0	65.0	73.0
In FRG	73.0	67.0	57.0	60.0
In countries of the world (100-599-megawatt capacity)	80.1	70.8	67.3	69.7
In CEMA member-countries (440-megawatt capacity)	73.4	74.8	75.4	76.6

Thanks to the close cooperation of CEMA member-countries, all cases of problems and defects of equipment in the operation of AES with VVER-440 reactors are analyzed by the appropriate planning, design organizations and

manufacturing plants. On the basis of this analysis, many improvements are introduced into plans of AES and equipment of the power units, improving their reliability.

The experience of using AES power units with a VVER-440 reactor should be individually considered for central-heating purposes. Inasmuch as the plan designated the provision of heat for users on operating turbines only at the AES site, interested organizations of the USSR, the GDR and Hungary carried out studies on using AES for supplying heat to closely situated centers. Atomic heat already goes to homes in Novovoronezhskiy Village from Novovoronezhskaya AES in the USSR, to the city of Greifswald in the GDR from the Bruno Loeschner AES and to the city of Paks in Hungary from the Paks AES. Preparation is proceeding for the introduction of a heat-supply system from the Kozloduy AES in Bulgaria and from the AES V-1 Bohunice in Czechoslovakia. Use of the heat of operating AES makes it possible to boost their economic value, to save organic fuel burned in city boiler rooms and, what is very important, to reduce the pollution of the air space.

The effect of radiation on AES personnel and the population of nearby population centers is insignificant: average doses of external irradiation of AES personnel do not exceed 10-15 percent of annual permissible dosage and are mainly caused in the performance of maintenance work, while the level of radioactive radiations in dwellings for constant and periodic presence of personnel are 1.5-2.0 fold below the norm.

Emissions of radioactive gases and aerosols as well as liquid discharges are lower than standard indicators by two or more orders of magnitude. With such insignificant emissions of radioactivity, the effect on the environment is practically nonexistent, while the radiation effect on the population is determined by global fallouts and the natural background for a given locality.

Thus, measures carried out at AES relating to deactivation of serviced and repaired equipment, special organization of maintenance work and all-round dosimetric monitoring ensure guaranteed nonexceeding of levels of radiation on AES personnel and the population.

Collectives of highly qualified specialists have been formed at the AES. The Soviet Union is constantly providing technical and methodological assistance in training and retraining of personnel for AES. At the training center of Novovoronezhskaya AES, which is equipped with training equipment, hundreds of specialists from CEMA member-countries have undergone training, and practical training directly at the AES is being conducted with the participation of Soviet specialists. An operative training center in the GDR and planned centers with training equipment in Bulgaria and Czechoslovakia make it possible to ensure qualitative training of personnel for future AES.

The successful operation of AES power units with VVER-440 reactors in the USSR, Bulgaria, the GDR and Czechoslovakia has created prerequisites for further development of atomic energy in the fraternal countries. In the period to 1990, about 20 AES power units with VVER-440 reactors will go into operation. In the GDR, erection is continuing of four power units at the Bruno Loeschner AES. In Hungary, construction and installation work is going

on of the third and fourth power units (Paks AES). Construction is starting on the Zarnowec AES (Poland) with four power units. Construction is unfolding on a broad front of the Juragua AES in the Republic of Cuba. The construction of AES is on a particularly large scale in Czechoslovakia. Here installation work is being completed and startup and adjustment work has begun at the AES V-2 Bogunice and construction and installation work of three power units at Dukovany AES and construction has been started of the third, the Mohovce AES, with four VVER-440 reactors.

The next stage in the development of atomic energy of CEMA member-countries is connected with the construction of AES with reactors of 1,000-megawatt capacity (VVER-1000).

By the end of 1984, four power units of this series were operating successfully and a number of AES are being erected with a unit capacity in excess of 3 million megawatts each. In the immediate years ahead, new power units will go into operation at Zaporozhye, Kalininskaya, Balakovskaya, Khmel'nitskaya and other AES.

With the technical assistance of the USSR, construction has been started of the first AES power units with VVER-1000 reactors in Bulgaria (at Kozloduy AES), in the GDR (at Stendahl AES) and in Czechoslovakia (at the Temelin AES). Preparatory work is going on for the construction of AES with the aforesaid power units at Belene AES in Bulgaria and the Moldova AES in Romania.

The 47th meeting of the CEMA Permanent Commission for Cooperation in the Field of Use of Atomic Energy for Peaceful Purposes held in Moscow toward the end of 1984 examined a report on the results of development of power units with VVER-1000 reactors. The Commission noted the high technical-economic indicators of operation of AES with these reactors and the correctness of the adopted plan and design decisions.

In the immediate future, it is proposed to use atomic energy as a source of heat supply in most of the CEMA member-countries. This means first of all AST--atomic heat-supply stations, ATETs--atomic heat and electric power plants and series AES with removal of heat for heat supply.

Thanks to the rapid development of atomic energy, by 1990 the share of production of electric power at AES will have increased at individual CEMA member-countries up to 15-40 percent.

The economic conference of CEMA member-countries at the highest level and the meeting held on its results by the 38th (Extraordinary) Session of the CEMA (June 1984, Moscow) outlined measures for the further development of cooperation of CEMA member-countries in the solution of the fuel and power problem aimed at changing the structure of power production and the primary development of atomic energy. These measures will be concretized in the program of construction of atomic energy stations and atomic heat supply stations up to the year 2,000 being worked out jointly by CEMA member-countries.

Accomplishment of this program will raise mutual cooperation of CEMA member-countries to a qualitatively new level with a significant increase in the amount of cooperation. For example, in the 12th Five-Year Plan alone, the scope of technical cooperation of the USSR in the building of AES in CEMA member-countries will increase by more than twofold compared to the 10th Five-Year Plan.

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USSR

BULGARIAN OFFICIAL LAUDS SOVIET NUCLEAR COOPERATION

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 11, Nov 84 pp 12-14

[Article by Oved Tadger, deputy minister of energy and raw-material resources of the People's Republic of Bulgaria: "VVER-1000 at Kozloduy AES--A New Advance in Cooperation"]

[Text] The dynamic growth of Bulgaria's economy and a rising living standard of the people call for further, more rapid and advancing development of energy compared to other sectors of the national economy.

The decisions of the 12th BCP Congress emphasize the necessity of increasing the share of electric power in the total energy balance of the country.

The major attention given to priority development of atomic energy is characteristic not only of the conditions of Bulgaria's economy. At the present time, all CEMA member-countries are being oriented to a change in the structure of energy production and expansion of cooperation in the development of atomic energy. This is going to be reflected in the joint development of a program for construction of atomic electric power stations and atomic heat-supply stations planned for up to the year 2000. An appropriate decision was adopted at the Economic Conference in Moscow in June 1984.

Bulgaria does not have deposits of petroleum, gas and high-quality coal. This is why the most promising direction of development is accelerated creation of atomic energy.

The foundation for the development of this sector in Bulgaria was laid by the signing in 1966 of an Intergovernment Agreement between the USSR and the People's Republic of Bulgaria on Cooperation in the Planning, Construction and Startup in Bulgaria of the First AES with Two VVER-440 in the City of Kozloduy.

Building of the Kozloduy 1 AES was started in April 1970 and in July 1974, the first unit of the station was connected to the country's electric-power system. It reached projected capacity in approximately 100 days. In 1975,

the station's second unit went into operation. Its capacity was attained in 39 days. These successes were achieved due to the tremendous assistance of the Soviet Union.

Simultaneously with the erection of Kozloduy AES a decision was adopted on the construction of a second section, Kozloduy 2, also with two power units equipped with VVER-440. A third unit went into operation in December 1980 and a fourth in May 1981. Both units reached full capacity in 27 and 30 days, respectively.

The accelerated start of the AES was helped primarily by timely working out of plans. Planning and design decisions were made while taking into account the specific conditions of Bulgaria. This applied to laying of foundations for the buildings, construction of the main building and so on. Thanks to use of slip forms, the main building was erected within the year.

All four power units of the station are essentially equipped with Soviet equipment. Its high quality is an important prerequisite for assuring economical and reliable operation by the Kozloduy AES. Soviet organizations, institutes, plants and specialists have provided and continue to provide all-round, highly skilled help at all stages of the station's construction--in the selection of the construction site, planning, construction, installation and startup of the units and in carrying out maintenance work, training and upgrading of the personnel's qualifications. Bulgarian power engineers received on-the-job training at the Novovoronezhskaya AES (USSR).

Since the startup of the fourth unit, the Kozloduy AES has been providing about 30 percent of the country's total output of electric power.

Today Bulgaria has entered a new stage in the development of atomic energy. It is planned that by 1990 the AES will provide 40 percent and by the year 2000--50 percent of the electric power produced in the country.

The chief role in the accelerated growth of electric-power production is being given to VVER-1000 units. The first two such units (fifth and sixth) are planned to be built on the site of the Kozloduy AES. Another four units will be erected at the new atomic Belene Electric-Power Station also located on the Danube River.

Power units with a capacity of 1000 megawatts will be installed on equipment made in CEMA member-countries and Yugoslavia on the basis of the Agreement on Multilateral Specialization and Cooperation and Mutual Deliveries of Equipment for Atomic Electric-Power Stations in the Period 1981-1990. This agreement raised to a new and qualitatively higher level cooperation among CEMA member-countries in the construction of atomic stations and served as an impetus to the development of their atomic power.

Soviet organizations and scientific-research institutes serve as the chief planners of 1000-megawatt capacity power units.

The VVER-1000 met the increased demands for seismic stability. They have high economic and operational parameters and likewise ensure conditions of safety and reliability of the AES.

Units with VVER-1000 were created and operate only in the USSR. The fifth unit of the Kozloduy AES will be the first unit with such a type of reactor being built within the CEMA framework outside the confines of the USSR.

In September a bilateral agreement was signed by the governments of the USSR and Bulgaria on cooperation in the construction of the Kozloduy 3 AES.

Accelerated construction of new atomic-power capacities for Bulgaria is of exceptionally important value for improving the structure of the country's energy balance for the next five-year plan. The fifth unit of the AES Kozloduy with a capacity of 1000 megawatts is planned to go into operation in 1986. Then after two years it is planned to start up the sixth unit of the station of the same capacity. In the future, it is planned to start up units of a comparable type at the Belene AES in Bulgaria in the same interval of time.

The construction of atomic capacities at an accelerated rate is economically effective also from the point of view of reimbursement. We know that during the initial period capital investment is especially large in atomic energy. In this connection, reduction of construction time is of significant value.

Attaching special importance to the construction of the fifth power unit of Kozloduy 3 AES, the Politburo of the BCP Central Committee and the Bulgarian Council of Ministers adopted a special decision. It indicated that the startup of the unit was especially important for the development of the country's national economy during the Ninth Five-Year Plan as well as for stabilization of Bulgaria's energy balance.

The technical plan of Kozloduy Atomic Electric Power Station 3 was executed by Soviet planning organizations. They are also providing blueprints of the reactor section, the machine room and a special building.

For the purpose of reducing the time of planning and construction, the plan of the Zaporozhskaya AES was used as a basis.

The Soviet side--Orgenergostroy Institute (Odessa)--prepared on a contractual basis a technical plan of organization of construction of a new section of the Kozloduy AES. According to this elaboration, the construction time of the fifth unit is 60 months from the time of laying the foundation area.

A decision of the Politburo of the BCP Central Committee and the Bulgarian Council of Ministers specifies reduction of the normative time of building a station by approximately 20 percent. For this purpose, it is necessary to concentrate material and manpower resources primarily at the chief locations of construction, to ensure flow and continuity of the process as well as the synchronization of the specialized construction and installation organizations, to make wide use of industrial methods in the work, to

combine parts and the performance of preinstallation operations to the maximum degree possible, to raise the mechanical and power ratio of the performing organizations, to undertake three-shift work and so on.

It is emphasized in the decision that the fulfillment of the set task should involve the introduction of an essentially new approach in construction on the foundation of modern rational technologies and a high level of mechanization and industrialization of this sector.

In the search for possibilities of speeding up the construction of the fifth unit of the Kozloduy AES, optimal solutions were analyzed relating to the erection of such units in the USSR. They apply primarily to Zaporozhskaya AES, where the highest level exists of consolidating construction structures and equipment. Proposals were studied in detail concerning obligatory technological rules of constructing AES in the USSR. The rich Soviet experience was used in the solution of problems connected with the erection of the first 1000-megawatt unit in Bulgaria.

The shortened time periods of work require a search for additional possibilities of speeding up construction and installation. In this connection the Bulgarian Ministry of Energy and Raw-Material Resources has proposed a new technology involving the use of exceptional construction mechanization. It has for its basis the idea of the possibility of installing basic technological equipment without closing the top of the building of the reactor section. This technology is arbitrarily called the "open method." Its chief feature is the use of a mobile crane with a lifting capacity of 385 tons.

For the purpose of speeding up construction, a power construction and installation base, shops for production of special metal structures, anticorrosion protection and other were created. Structures of reinforced-concrete elements are arriving from many plants in the country for the apparatus section, the special building and the diesel generator station, steel columns for the machine room and so on. Together with construction of the buildings, finishing work has been started in the compartments.

Construction is imminent of the components of the hermetic area of the apparatus section and the shell.

Contracts have already been concluded with trade organizations of the USSR and other socialist countries for export of equipment, the basic part particularly from the Soviet Union. The GDR will supply a polar crane and transport technological equipment, Bulgaria--a materials handling machine and a special water-purification system, Poland--generator stations, Romania--the main circulation pumps and air-tight valves and Yugoslavia--special pumps, fittings and other things.

But delivery of equipment does not exhaust the cooperation of CEMA member-countries in the construction of the fifth power unit of Kozloduy AES. At the present time, workers from Poland and Vietnam are taking part in construction of the facility. Recently a special construction brigade arrived here from the Republic of Cuba.

Simultaneously with the construction of the station, a large-scale program is being carried out of creating a social infrastructure from the atomic power complex in Kozloduy. Dwellings, schools, stores, kindergartens and facilities of the cultural, personal-service and sports type, rest homes and so forth are being built.

Conditions are being created for the work, sports and rest of the large collectives of construction, installation and power-engineering people who are working on the erection of this unique facility and will take part in its operation.

The erection of training equipment for the VVER 440 and VVER-1000 is planned at the training center for training operative personal for work at the AES.

The construction of Kozloduy 3 AES is a symbol of the growing economic and industrial power of the countries of the socialist community and of friendship and mutual cooperation.

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BRIEFS

TURKEY-CANADA NUCLEAR COOPERATION AGREEMENT—An agreement on Turkish-Canadian cooperation on the peaceful use of nuclear energy has been signed in Ankara. The agreement was signed by Foreign Minister Vahit Halefoglu and Canadian Ambassador to Ankara Gilles Mathieu. Halefoglu pointed out that this is the first such agreement signed by Turkey. Noting that Turkey is getting ready to implement a program on extensive nuclear energy production, Halefoglu added that signing such an agreement with Canada, which is one of the world's leading countries in nuclear technology, will be very beneficial. He added that the agreement will help develop bilateral economic cooperation and that it will create new cooperation opportunities. Mathieu said that the essence of nuclear energy requires long-term cooperation among countries on the issue. Pointing out that with this agreement the Turkish and Canadian Governments will be able to contribute to the development of nuclear cooperation and the prevention of nuclear arms proliferation, Mathieu added that Canada has so far signed agreements with some 20 countries on the issue. He noted that this agreement envisages the exchange of equipment and technology in the nuclear energy field and the peaceful use of nuclear energy. [Text] [Ankara Domestic Service in Turkish 1000 GMT 18 Jun 85 TA]

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SWEDEN

NUCLEAR POLICY DEBATE REVIVED OVER DATE FOR FINAL SHUTDOWN

Loading of Plant at Issue

Stockholm DAGENS NYHETER in Swedish 4 Jun 85 p 8

[Article by Ake Ekdahl: "Non-socialist Quarrel about Deadline"]

[Text] The issue of nuclear power has become an explosive one between the Center Party and the Conservatives. The differences between them became obvious in Monday's Riksdag debates on energy policy, and were utilized appreciatively by the Social Democrats, as well as by Minister of Energy Birgitta Dahl, who requested a clarification of the Center Party's position. "It looks like the Center would yield to the Conservatives in a non-socialist government," she remarked in amazement.

The debate mostly was centered on which government could be best trusted with the task of phasing out the use of nuclear power.

The minister of energy offered, in her concluding remarks, a middle course involving the responsible development of nuclear power in preparation for the future. She said that there was no room for an energy policy based on positions of extremism.

No Shutdown Date

The Center Party, the Liberal Party and the Communists expressed their support for the main thrust of the government's current policy. The Conservatives stressed that there should be no shutdown date for nuclear power.

"Those of us who support the results of the popular vote and current developments should be able to band together and mobilize the majority which is in fact to be found in the Riksdag," Dahl said. "What we need is a Social Democratic government that the Center, the Liberals and the Communists can support."

She said that she believed that the general national skepticism as to whether the results of the popular vote will ever be achieved was the fault of both the supporters and the opponents of nuclear power.

Olof Johansson, of the Center Party, and Oswald Soderquist, of the Communists, believed that the mistrust of the government's capability to fulfill its developmental promises was due to the fact that the government had not acted concretely enough to clearly indicate what its goals were. But Johansson was more disturbed by the attitude towards nuclear power demonstrated by the Conservatives.

"Conservative MP Per-Rickard Molen has been talking about nuclear power in the same way as the power companies in whose laps the Conservative government members once sat, conspiring against their own kind, in the governments between 1976 and 1978," Johansson said.

Pressure

The basis of Johansson's comment was the new disclosure that Costa Bohan had yielded to pressure from the power companies to continue with the loading of Barseback 2.

"It would be good if we could set some limiting factors in this debate. It would be very significant for our future," Johansson said. He also maintained that the "unholy alliance" between the Conservatives and the Social Democrats should be dissolved, or that the energy minister's statements, at least, indicated as much. Molen considered the energy minister's unexpected entrance into the debate (instead of the usual Social Democratic spokesman, Nils Erik Waag) to be a sign of internal factionalism within the governing party. "What it amounts to," he said, "is that the minister of energy has no confidence in her party's representatives in the Riksdag.

"More people besides Waag ought to be thinking about repenting, about changing their attitudes towards nuclear power. We have not yet heard from Sven Duvor, who has his own ideas on the subject, and has been active in his party on the energy policy issue," he continued.

The Conservatives have gradually softened their pro-nuclear-power talk of security reactors in Vartan and other locations, and it has thus been determined that the differences between the Center Party and the Moderates are not so extensive, involving only the goal date for shutting down the plants.

The quarrels between the Center and the Conservatives reveal a factionalism which makes normal government functioning impossible, according to Birgitta Dahl. "Are they thinking of giving up in favor of the Conservative policy, of abdicating and entering into a non-socialist three-party government, or of trying to postpone energy policy decisions until later?" she asked.

Liberal Party MP Hugo Bergdahl was most disturbed by the government's plans for developing our untouched rivers.

"We cannot be absolutely certain that we can manage a nuclear power shutdown if we close all the doors to increased water power," Dahl answered him. "This is why we need to be thinking of being ready for some development in this area. But it will not be anything massive," she asserted.

She spoke again of the alternative of a non-socialist government, maintaining that that Center Party had been nimble enough this time to escape from the nuclear power maze, although it didn't last. This was why the non-socialist parties lost credibility when they tried to unite with the Conservatives.

SDP Seen Changing Stand

Stockholm DAGENS NYHETER in Swedish 4 Jun 85 p 2

[Editorial: "Nuclear Power Back in Focus"]

[Text] Nuclear power is back in center stage in national politics, as evidenced by the debate on energy in the Riksdag yesterday. The main attraction was a hand-to-hand combat between Energy Minister Birgitta Dahl (Social Democratic Party) and former Energy Minister Olof Johansson (Center Party). It looked like the squabble in the usual style. But under the surface, there was a basic agreement between both parties that nuclear power must be and could be shut down, by the year 2010 at the latest--and with large-scale benefits for our economy, industry and environment, as Mrs Dahl stated--and that the Conservatives had now definitively abandoned their plans for this shutdown.

Birgitta Dahl stubbornly continued to ask whether the Center Party could find it in itself to react against the Conservatives. It looked like there were not going to be any shutdown plans, and the issue was too important to put on ice as an inter-party controversy. "Have we acquired the reputation of giving in to the Conservatives?" was Olof Johansson's answer to her. He countered with a question as to whether the "unholy alliance" between the Social Democrats and the Conservatives on the nuclear power issue would ever be dissolved. "If they manage to get that done during the electoral campaigns," he said, "it can have great significance for our future." This sounded to us like a hint of some kind.

Johansson's attacks on the Conservatives were not of the sort one could ignore. He made unequivocal reference to Sven Bergquist's new book, "The Hot Years" (published by Timbro), which tells of how Gosta Bohman was persuaded at the time of government changeover in 1976 by Asea boss Curt Nicolin and Sydkraft director Goran Ekberg not to yield to Falldin's requests relative to the loading of Barseback 2, when he spoke of "former government members between 1976 and 1978 who sat in the laps of the big energy companies." Referring to NY TEKNIK's recent revelations on how deliberately--and secretly--the first nuclear power was set in operation in Sweden, based on existing plans for Swedish nuclear weapons, Johansson spoke ironically of a young Conservative (read: Carl Bildt) who had stepped forward as defense attorney for the Social Democratic government, and who was uninterested in history.

If Olof Johansson continues to gain influence in the Center Party, then a new coalition with the Conservatives would have some chance of lasting quite a while. And even Thorbjorn Falldin announced for his political comeback the same day that "it is not the Center Party that should be blamed" if the

formation of a non-socialist government should fail in fulfilling the results of a popular vote. Nuclear power continues to tick away in the form of a political time bomb.

But nuclear power continues to be a bugbear for the socialist wing as well. The issue has certainly never achieved that "reasonable solution" mentioned by Olof Palme the other day when he presented a cooperative proposal to the environmentalists.

It was, in fact, the Social Democrats themselves, as opposition party, who requested a shutdown schedule for nuclear power. This was at about the same time as they came out with prospective plans for up to twenty large-scale carbon condensation power plants--an idea which they recently have suppressed, fortunately, in the aftermath of the debate. But although the EK 81 investigation was expected, according to its commission, to propose a shutdown schedule, it seems that a common understanding between those old allies--Social Democrats, Conservatives and Liberals--had the result that no such schedule was produced, not even a hint of one.

And every time Birgitta Dahl speaks, sincerely and with animation, saying that nuclear power ought to be phased out, for heaven's sake, since it is our moral duty, and not only that, but it would be a relatively simple process at this time, technologically and economically--every time she says this, the other leading Social Democrats become even more silent and discreet on the issue. There is no question but that her motives are sincere. But what is it that forces her to go on with this strange masquerade, saying that a shutdown schedule--a plan for when and how the reactors should begin to be closed down--will not be necessary for some time now?

Besides this, in yesterday's Riksdag debate Birgitta Dahl complained a number of times that, as she saw it, it was somewhere in the leadership of the Center Party that Borje Hornlund's--and probably also Olof Johansson's--desires had been foiled, since he had hoped that the EK 81 project would involve an agreement with the Social Democrats on a plan of this kind, which, as is obvious, should begin to be put into action in 1995. The Center Party, on the other hand, countered in the debate by saying that it had been the Social Democrats who had hopped off of the bandwagon of decisiveness at the last minute. It doesn't really matter which is to blame, and they probably will each make an additional accusation or two of this kind--but what is interesting here is that the two parties were obviously very close to agreeing on this point some time recently. What do you think: perhaps each of the two parties would like to keep this nice bone of contention to gnaw on, since it possibly could be offered in exchange for greater political gains, say, after elections this fall?

This government's vagueness in practice, if not in theory, has had the result that, at this time, only one Swede in ten believes that nuclear power will have been phased out by the year 2010, at the latest. At the same time, Campaign List 3, which proposes that nuclear power should be phased out as early as 1990, is now showing the most support in the opinion polls--39 percent--while the more obvious "yes" option, List 1, has gained only at the cost of the more ambiguous List 2.

What the Social Democrats are experiencing here is a credibility gap, which can become a problem even among their own ranks (since the "no" option has more supporters than the "winning" second option). Nor have nuclear power hawk Nils Waag's remarks in Friday's DAGENS NYHETER interview, or his inglorious retreat in the face of the energy minister's wrath, improved matters at all.

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TURKEY

'THREAT STATUS PLAN' FOR 6TH FLEET NUCLEAR VISIT

Istanbul CUMHURIYET in Turkish 30 Apr 85 p 12

[Text] Ankara (CUMHURIYET BUREAU) - A nuclear cruiser attached to the American 6th Fleet in the Mediterranean will reportedly visit Antalya Port next month. A "threat status plan" is said to be in progress in Antalya vis-a-vis the ship's nuclear wastes. Some Mediterranean nations, led by Greece, have decided in view of the nuclear waste threat not to allow U.S. ships using this kind of fuel into their ports.

According to information confirmed by Turkish officials, the nuclear ship's arrival date at Antalya Port was set as 20 May and measures have begun to be taken against dangerous situations that may occur during the ship's visit.

The arrival of this ship will add one more to the visits that have taken place since Turkey responded positively to a request by the American administration nearly 3 years ago to have port facilities provided at Turkish ports for ships attached to the Sixth Fleet.

However, since the presence of nuclear ships in the Sixth Fleet requires that special measures be taken during the visits of these ships, Turkish authorities were motivated to draw up special guidelines for this purpose. Inter-agency efforts resulted in the compilation of a directive on "matters pertaining to visits of nuclear ships attached to foreign armed forces," which went into effect upon publication in the RESMI GAZETE on 15 December 1983.

In accordance with the directive, American officials informed the Turkish Ministry of Foreign Affairs of the visit at least 90 days in advance of the arrival date, according to information obtained. The permit required for the nuclear ship's visit was forwarded to the American embassy in Ankara by the Foreign Ministry following approval by the relevant agencies.

The competent authorities reported that the measures required by the directive governing visits of nuclear ships have begun to be taken in Antalya prior to this visit.

Preparations

Accordingly, a commission was formed in Antalya chaired by a deputy for the governor and consisting of representatives appointed by the Turkish Atomic Energy Commission [TAEC], the commander of the provincial gendarmerie regiment, a representative of the Coast Guard Command, the security director, the provincial defense secretary, the health director, a State Hydraulic Affairs representative and the mayor. The commission began work on a "prevention plan" and a "threat status plan" to meet the needs of any eventuality.

In accordance with the directive, a series of measures was specified that would be taken in such areas as port security, communications, fire, police and health protection and radiation control.

According to the "threat status plan" in progress, a control region will be designated to which the people of the area that might be affected in the event of a threat could be brought in the minimum amount of time that a radiation threat would require. In the event of a heightened threat, the port would be evacuated with "maximum speed" and a control region will be set up for this purpose. Evacuation plans and other matters deemed necessary will reportedly be included in this plan.

Meanwhile, the TAEC and experts from the Cekmece Nuclear Research and Training Center will take samples of sea water at Antalya prior to the nuclear ship's arrival. Special instruments will measure fuel wastes that the ships may leave during the actual visit to determine whether any radiation is present.

Nuclear ships can remain at sea for 2 years with the nuclear fuel produced by their own reactors without taking on extra fuel from outside.

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